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NEW YEAR GREETINGS.

When this number of the AMERICAN EXPORTER reaches our readers throughout the world, the new year of 1907 will have become quite familiar. We extend to all our heartiest greetings and wishes that this year, which opens so auspiciously, may bring with it a continuance of the general prosperity that has marked the course of the past twelve months.

The year 1906 will long be remembered as one of the most remarkable in the history of the world. Through Commerce, the great peacemaker, the old year has accomplished more than in any preceding year in bringing the nations of the world into closer touch. Today prosperity is everywhere, and upon the shoulders of the new year rests the responsibility of continuing a record of general welfare and international good will that extends to the remotest corners of the globe.

The present year marks the thirtieth anniversary of the establishment of the AMERICAN EXPORTER. It is, therefore, fitting that we offer to our readers cordial thanks for their interest and hearty co-operation, which have contributed so generously toward widening the scope of our work and made possible the success which has attended our efforts.

"The office of a good newspaper is to represent well the interests of its time." This principle we shall strive, as in the past, to keep ever in view in the future. There is no such encourager of friendly intercourse, no such enemy of wars, no such upholder of peace, no such messenger of good will as trade, and with this conviction ever before it the AMERICAN EXPORTER may be relied upon to continue to contribute its best endeavors to the development of international business.

OUR FOREIGN TRADE IN 1906.

In the main the business year just closed has repeated the "record-breaking" achievements of 1905, and in practically the same directions. In the one year as in the other new high levels were established in every direction reflecting activity of trade. The figures in this article show beyond peradventure that export business has been on an immensely larger scale than during 1905, which itself fixed wholly new precedents.

For ten years the commerce of the country, both domestic and foreign, has shown steady growth. According to the figures at hand, brought practically down to date, there seems to be little doubt that during 1906 the total foreign trade of the United States, including imports and exports, for the first time in the history of the nation exceeded $3,000,000,000. This would mean an increase of approximately $225,000,000 over 1905, and the final figures may prove the increase to have been even larger.

The most gratifying feature in our foreign trade of 1906 is that our exports have exceeded the imports by no less than $600,000,000. This calculation is based on the statistics for the twelve months ending with November, during which the exports amounted to $1,807,000,000 and the imports to $1,287,000,000, according to the latest compilation of the Bureau of Statistics. Moreover, in the increase of total commerce noted, the greater growth is in exports. The increase of exports over those of 1905 will amount to upward of $125,000,000.

Nor should it be forgotten that from the above figures showing the foreign trade of the United States there has been deducted, within the last decade, an immense sum which is now included under the head of trade with the non-contiguous territory of the United States. This includes, of course, all the commerce with Porto Rico and the Philippines, which formerly went to swell the figures of the foreign trade. At present, under the head of non-contiguous territory, are classed Alaska, Porto Rico, Hawaii, the Philippines, Guam, Midway and Tutuila. The trade of the United States with these territories for the year will approximate $140,000,000, of which sum $85,000,000 is represented by imports and $55,000,000 by exports, if these terms are permissible in referring to trade with the insular possessions of the nation.

It is gratifying to state that the country is making tremendous strides in its exports of manufactured articles. For the year the value of manufactured products exported will exceed $700,000,000, an increase of approximately $75,000,000 over the previous year. In other words, the exports of manufactures will constitute about 43 per cent. of the total exports, as against 30 per cent. in 1905 and 22 per cent. ten years ago. As usual, iron and steel lead in the list of exported manufactures. This class of exports will run up to nearly $170,000,000. Eight years ago they slightly exceeded $50,000,000.

The list of manufactures of iron and steel is led again by agricultural machines and implements, the exports of which during 1906 aggregated nearly $25,000,000, an increase of more than $3,000,000 over the previous year. As in past years the Argentine Republic was our largest buyer in this line, followed in their order by Russia, France, Canada and Germany. Considerable quantities of agricultural implements were also shipped to the United Kingdom, Australasia, Holland, Italy, Mexico, Cuba and Chile.

The exports of electrical machinery amounted in value to over $8,500,000, an increase of approximately $1,500,000 over those of the year 1905. In this line our largest customers were Canada, England, Mexico, Japan, Brazil and Cuba. It is very gratifying to note that our exports of electrical machinery to South America have largely increased during 1906, and it is to be hoped that our manufacturers will make energetic efforts to establish a firmer foothold in the markets of the southern hemisphere.

Metal-working machines were exported to the value of over $8,000,000, an increase of 60 per cent. over the year 1905. No other item in our machinery exports makes a better showing, and nothing more clearly indicates a general prosperity in all parts of the world. There can be no doubt that the exports of metal-working machinery would have been much larger if our manufacturers had not been so busy with domestic orders, and, as a matter of fact, millions of dollars' worth of machine tool orders are already booked for the first six months of the present year. As usual, the greatest quantities of machine tools were shipped to Europe, particularly to the United Kingdom, Germany, France and Belgium. Large shipments also went to Canada, Russia, Mexico, Scandinavia, South America, the Far East and the West Indies.

Over 600 American-built locomotives, exceeding in value $6,000,000, were exported during 1906. This is an increase of 20 per cent. over the previous year, and the particularly noticeable feature is the fact that a number of locomotives were again shipped to Europe in 1906, while no locomotives were exported to the Continent during the year 1905.

There has also been a noticeable increase in the exports of stationary steam engines and boilers. The aggregate value of these exports during 1906 was over $4,200,000, an increase of $700,000 over 1905. Our largest customers in this line of machinery were Canada, Mexico, South America, Japan and Australasia.

Pumps and pumping machinery were exported to the value of approximately $4,000,000, an increase of $500,000 over the exports of the preceding year. Our largest customers, as in 1905, were the United Kingdom, Mexico, Canada, South America, Australasia and the Far East, while considerable quantities of pumps were also shipped to France, Holland, Germany, Russia and other European countries.

While our exports of wood-working machinery are not as yet very large, they are increasing. During the year under review they amounted in value to nearly $900,000, an increase of more than 10 per cent. over the previous year. This is another line the exports of which could be greatly increased by a little effort on the part of manufacturers.

Steadily increasing are also the exports of mining machinery, laundry machinery, printing presses, shoe machinery, windmills, etc.

Sewing machine exports reached a value of nearly $8,000,000, a considerable increase over 1905.

Exports of American made typewriting machines have been steadily growing during the last few years, and in spite of the great competition their exports are still increasing. In 1906 over $5,800,000 worth of typewriting machines were exported, being shipped to almost every part of the globe.

An enormous increase has taken place in the exports of American hardware. Our foreign trade in builders' hardware alone, such as locks, hinges and similar goods, reached a value of $7,200,000, or an increase of nearly 20 per cent. over the year 1905. Steadily increasing are also the exports of small tools, including saws, files, rasps and other small implements for artisans, their combined exports representing for the year under consideration a value of $7,500,000. In builders' hardware and small tools our largest customers were, in order of importance, Canada, England, Australasia, Mexico, Cuba, Germany, Argentina, France, Chile, Japan, British Africa, etc.

Immense quantities of safes, scales and balances, stoves and ranges, lamps and chandeliers, garden tools, firearms, washing machines, table and pocket cutlery, cash registers, hoop and band iron, wire and wire nails, structural iron and steel, car wheels and castings were also exported to most parts of the world.

That American boots and shoes can now be found in almost any country on the globe is well known. During the year 1906 the value of boots and shoes exported was nearly $9,500,000, the largest markets having been the West Indies, England, Canada, Mexico, etc.

Steadily growing are also the exports of American furniture, which last year reached a value of $5,000,000. In this line our best customers were Mexico, Canada, England, Cuba, Australasia and British Africa.

Musical instruments form another item of importance. The value of their exports exceeded $3,500,000, and consisted chiefly of organs, pianofortes, pianolas and other piano players.

Paper and manufactures thereof were exported to the value of nearly $10,000,000, an increase of more than 10 per cent. over the previous year. Considerable were also our exports in paints, colors and varnishes, these having exceeded in value $4,750,000.

The above figures show the tremendous extent of our steadily increasing foreign trade.

AN AMERICAN HAGUE.

Mr. Andrew Carnegie, the great American steel master, has given $750,000 for the erection of a new home in Washington for the Bureau of American Republics. Mr. Carnegie says he hopes and expects that the bureau will grow in usefulness and scope until it becomes the heart and soul of that great movement for unification of Pan-American interests which has already received the powerful encouragement of President Roosevelt and extraordinary impetus from the recent visit of Secretary Root to the nations south of the Caribbean. In his own words Mr. Carnegie expects the new home to become "an American Temple of Peace."

Mr. Carnegie's generous gift increases to approximately $1,000,000 the sum which may now be devoted to the establishment of a suitable home for the institution from which so much is expected. The United States Government has appropriated $200,000 for the purchase of a site, and the South American republics have subscribed their quota of $50,000, a considerable portion of which has already been deposited in the treasury of the United States. Mr. Carnegie's gift will make it possible to devote the sum raised by the American republics to the purchase of a suitable site, while his gift will be expended for the erection of a building which he believes will constitute "an American Hague."

The deep interest which Secretary Root has taken in cementing the ties which bind the American republics together is well known. The comprehensive and salutary effects of his South American visit have borne abundant fruit, and Mr. Carnegie has determined to contribute of his wealth to the substantial furtherance of the laudable purpose for which Mr. Root has done so much.

A union intangible but not the less binding of these republics which have so much in common, the promotion of their trade relations, the increase of mutual knowledge to a point that will render misunderstandings impossible, the promotion of their solidarity when confronted by the opposition of nations on other continents—all these constitute the laudable aims of the Bureau of American Republics, and those most familiar with the great movement are convinced that the establishment of such a home for this institution as Mr. Carnegie's gift makes possible will go far to insure the accomplishment of these aims.

TRADE OF PORTO RICO WITH THE UNITED STATES AND FOREIGN COUNTRIES.

The remarkable growth in commerce between the United States and Porto Rico, as illustrated by some figures just prepared by the Bureau of Statistics of the Department of Commerce and Labor, is especially interesting at the present moment in view of President Roosevelt's recent message regarding Porto Rico. The figures just announced show that the trade between the United States and Porto Rico in the calendar year 1906 will exceed $40,000,000, against less than $4,000,000 in 1897, the year before annexation.

The value of merchandise sent from Porto Rico to the United States in the ten months ending with October, 1906, is $19,320,137, and of merchandise sent from the United States to Porto Rico in the same period $16,509,946, making a total for the ten months of $35,830,083, and thus apparently justifying the assertion that for the full twelve months ending with December the total will exceed $40,000,000. In the calendar year 1897, the year immediately preceding annexation, the total imports into the United States from Porto Rico were $1,943,251, and the total exports to that island, $2,023,751, making a total of $3,967,002, or less than one-tenth of the total promised for the year which ends with the present month.

Not only has the trade of Porto Rico with the United States increased enormously, but the general trade of the island shows also a large increase during the period in question. The total value of merchandise passing in and out of the island in 1906 was practically twice as great as that of any year prior to annexation. This remarkable growth in the general commerce of the island, a result of the growth of production of staple articles entering com-

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merce and the consequent growth in the consuming power of the people, is shown by figures compiled by the Bureau of Statistics, which for the first time state the values in gold of the imports and exports of the island in each year for a long term of years and thus enable an accurate comparison of the commerce today with that existing under Spanish control. The figures thus compiled show that the exports of the island in the fiscal year 1906 were $23,250,000 against $12,750,000 in the highest year prior to annexation, 1892, and the imports were in 1906 practically $22,000,000, against an annual average of about $12,500,000 under Spanish rule.

A very large proportion of the trade of Porto Rico is with the United States. Of the total merchandise leaving the island, 87 per cent. goes to the United States, and of the total merchandise entering the island, 86½ per cent. is from the United States, these figures being based upon the records of the ten months ending with October, 1906, the latest available figures of the Bureau of Statistics of the Department of Commerce and Labor. In 1896, two years prior to annexation, the share of the exports sent to the United States was 14 per cent., and the share of the imports taken from the United States 21 per cent.

The principal articles forming this large and rapidly growing trade with Porto Rico are sugar, tobacco, coffee, fruits, in the shipments from the island; and flour, rice, meats, dairy products, cotton goods, manufactures of iron and steel, and miscellaneous manufactures in the shipments from the United States to Porto Rico. In the ten months ending with October, the latest period for which figures have reached the Bureau of Statistics, the value of the principal articles shipped from Porto Rico to the United States was as follows: Sugar, $14,490,822; cigars, $2,980,202; leaf tobacco, $511,675; molasses, $421,223; oranges, $244,462; other fruits, $146,655; straw and palm leaf manufactures, $123,347; hides and skins, $92,617; preserved fruits, $46,398; iron and steel manufactures, $44,581; tobacco stems and trimmings, $33,330; raw cotton, $30,660, and perfumery and cosmetics, $25,749.

The article in which the chief growth occurs is sugar, of which the value of the shipments from the island to the United States in the ten months ending with October, 1906, was $14,490,827, against $13,083,084 in the corresponding months of 1905, $9,213,162 in the same months of 1904, and $6,655,750 in the corresponding months of 1903.

In the shipments of merchandise from the United States to Porto Rico the number of articles is much larger than in the shipments from the island to the United States. The articles sent to Porto Rico include, naming them in the order of importance and value: Rice, $2,808,446; cotton manufactures, $2,387,246; manufactures of iron and steel, $2,338,146; meat and dairy products, $1,626,439; breadstuffs, $1,153,830; wood and manufactures thereof, $852,071; while under these general groups are included such articles as flour, $905,585; lumber, boards, etc., $346,901; pork, salted or pickled, $470,087; boots and shoes, $337,970; leaf tobacco, $330,864; cod fish, $330,461; hams, $270,994; lard, $254,061; fertilizers, $226,398; lard compounds, $211,406; steel rails, $195,752; street railway cars $194,013; bleached cotton cloths, $192,992; colored cotton cloths, $187,408; unbleached cotton cloths, $128,552; bread and biscuit, $148,686; iron sheets and plates, $154,333; bituminous coal, $146,730, and illuminating oil, $116,732.

GATEWAY OF ABYSSINIA.

Mr. Frank R. Mowrer makes his first commercial report as consul general at Adis Ababa, on Jibuti, the principal settlement and harbor in the protectorate of the Somali coast and dependencies, and the seaport for Abyssinia.

Until 1892 Obok was the chief village, but Jibuti was then chosen as the seat of the colonial government, on account of its superior harbor, which, although unimproved, is very deep and unobstructed and affords safe anchorage for several hundred vessels, and because of the more easy construction of the railway to Abyssinia than through the desert and the mountains of the Tadjourah district. It is contended that the harbor is the best from Suez to the Far East. Almost unlimited quantities of coal, water and provisions are stored here to supply ships, although as yet this business is unimportant. The outlying district for about 18 miles in width is desert, and the town itself cannot be said to have any commerce. It is solely a transit and forwarding center.

The chief factor that makes for the future of Jibuti is the railway, 186 miles in length, to Diré-Daonah, at the Abyssinian frontier. The complete scheme is that this line shall be extended to Adis Ababa, in the heart of Abyssinia, concerning which the three powers—Great Britain, France and Italy—have made a joint proposal to Emperor Menelik for its control and the initiation of certain reforms. Prior to the existence of the railway to Diré-Daonah all the merchandise to and from Abyssinia passed by Zeilah, in British Somaliland, 36 miles southeast of Jibuti. Thus it is now that Abyssinia sends by Jibuti skins, ivory, wax, coffee, musk and gum, and receives cottons, petroleum, sugar, candles, hardware, alcohol, Marie Therese dollars, etc.

There are at Jibuti about 350 Europeans, chiefly Government and railway employees and merchants, and from 15,000 to 20,000 natives, much like nomads in habits. They seem to have no initiative for progress, though intelligent by nature and peaceful, and know no necessity of life, save to eat and to sleep. They are employed as coolies to load and discharge cargo and as servants, being composed of the Somali and Daukali tribes of the region, and Yemen Arabs.

The local commerce is practically nil. Most of the firms are agents for or in some way connected with the exportation or importation of goods of Abyssinia. With the completion of the railway to Adis Ababa the immense natural wealth of Abyssinia would be opened up, and Jibuti would become the emporium for East Africa—notwithstanding the Cape to Cairo Railway—as Harrar, the most productive province, is nearer Jibuti.

MALLECO VALLEY, ONE OF THE RICHEST AGRICULTURAL DISTRICTS IN SOUTHERN CHILE.

FOREIGN TRADE OF THE WEST COAST OF SOUTH AMERICA.

BY W. J. JOHNSTON.

From south to north, the countries bordering on the Pacific coast of South America are Chile, Peru, Ecuador and Colombia. The great republic of Bolivia, though stretching out on the western part of the South American hemisphere, has no coast line, but geographically it must be classed as a Pacific coast country, on account of its outlet to Chilean and Peruvian seaports.

The population of western Colombia and of Ecuador, Peru, Chile and Bolivia is approximately 11,000,000, located chiefly along the seacoast.

The foreign trade of the West Coast of South America is assuming larger proportions from year to year. An analysis of the foreign commerce of those countries shows that it now exceeds $212,000,000, and is increasing. The intercoast trade, which in the official returns is included under the foreign head, may be placed at about $12,000,000. There is left, therefore, approximately $200,000,000 of international traffic for Europe and the United States.

The marked feature of the West Coast countries in recent years is the growth in consumptive capacity, as shown by the imports, for the increase in population has not been large.

Of all the countries on the West Coast of South America, Chile is by all means, industrially and commercially, the most important. Reports from Valparaiso and Santiago are to the effect that the people of Chile are heroically overcoming the great calamity brought about by the recent earthquake, and there can be no doubt that a new and magnificent capital will arise from the ruins of old Valparaiso.

Chile, geographically and economically, is divided into several distinct sections, whose climatic and industrial characteristics create demands for quite different classes of foreign commodities. Confined as it is to a narrow strip of territory between the mountains and the sea, and stretching north and south over 2,000 miles, it includes within its borders every variety of climatic conditions, and its products and industries differ in the various dis-

IN THE MOUNTAINS OF ECUADOR.

tricts as much as do those of the New Jersey coast and the plateau of Mexico. A clear idea of these differences as reflected in commercial possibilities can best be obtained by analyzing the character of the imports into the various sections. These divisions are, in rough outline:

1. The arid and semi-arid section of the north.
2. The commercial and industrial section of the center, including the two largest cities of the country, Santiago and Valparaiso.
3. The agricultural and pastoral section of the south central region.
4. The forest section.
5. The cold zone of the far south, whose chief industries are pastoral and mining.

Up to the present time Chile has chiefly drawn the bulk of its imports from Great Britain, Germany, United States, France, Belgium and Italy. The share of the United States in the total trade is still small, but increasing. From fourth place we have risen in the past ten years to third place, having passed France by a considerable margin. Italy supplies considerable quantities of cheap cotton goods and wines, which two items are chiefly responsible for the large amount of Italian imports.

There can be no doubt that the conditions of population and development of industries in Chile are such as to demand increasing purchases of iron and steel and their manufactures rather than of other classes of goods. The population is not growing rapidly, as in Argentina, for instance, and we cannot, therefore, expect to see any very great increase in the imports of those classes of goods with which the people are fed and clothed. The demand of the future will be for goods which are to be used in the development of the national industries, and these industries are such as to require increasing quantities of iron and steel goods, especially machinery. Chile is essentially a mining country; nearly 88 per cent. of its exports are of mineral products. Nearly every important mineral of commerce is to be found somewhere within its borders, and there are signs of increasing activity in the extraction of every one of them. Mining operations, until recently, have in the main been of the simplest kind, requiring relatively little modern machinery and appliances, but a very notable change is going on. The richer and more accessible deposits have been partly worked out, and owners are learning the necessity of effecting economies by introducing new processes. These new processes must demand foreign purchases of machinery or materials from which machinery is made.

The other chief industries of the country—agricultural, horticultural, pastoral and lumbering—though of small importance compared with mining, and not likely for some time to develop beyond the point of supplying home demands, have this in common with the mining industry, that in order to grow they require the introduction of modern methods, modern machinery and modern appliances.

Though the present condition of Chile is such as to make it certain that iron and steel and manufactures thereof are to become more and more prominent among the imports, and thus improve the trade prospects of the United States, there are numerous other lines which open up an increasing larger market for American goods.

Cars and carriages, drugs, paints and colors, colored cotton goods, glassware, scientific instruments and apparatus, lubricating oils, paper, lumber, hardware and domestic machinery, agricultural implements, clocks and watches, cordage and twines, leather and leather goods, woodenware, office and household furniture, cotton and other textiles and various other articles, all show encouraging increase. In some of these we hold a virtual monopoly of the trade; in others we have made sufficient advance to indicate that we are beginning to be able to meet European competition.

The foreign commerce of Peru may be placed at about $44,000,000 annually. The imports into the republic of Peru have increased from a little over $8,000,000 in 1897 to nearly $21,000,000 in 1905, the last year for which official returns are obtainable, an increase of about 160 per cent. The chief imports of the country include iron and steel, textiles, foodstuffs, coal, drugs, paints and colors, paper, leather and manufactures thereof, hardware, household goods, etc. Great Britain still furnishes the greater part of Peru's imports, followed next by the United States. However, our trade with Peru has steadily increased of late, which is due largely to the growth of American investments in Peru, now estimated at $30,-

TYPICAL HARBOR SCENE, CALLAO, CHILE.

CORDILLERAS OF CHILE.

000,000. The greatest increase is shown in the imports of manufactures of iron and steel.

There can be no doubt that our manufacturers could considerably increase their trade with Peru if they would make proper efforts. The foreign trade of the country is chiefly centered in Lima and the ports of Callao, Mollendo, Salaverry, Iquitos and Payta.

The import tariff of Peru consists almost entirely of ad valorem rates of duty, which, in common with the general custom in South American countries, are virtually made specific by means of a valuation tariff fixing the values of merchandise for customs purposes. The free list includes, among other products, steel in bars or sheets, copper wire, plows, pumps, coal, roman cement, copper, explosives, railway appliances, agricultural implements, fire bricks, all kinds of machinery, sewing machines, boilers, cranes, etc.

The republic of Colombia, in the northwestern part of the South American continent, is bounded by the Caribbean Sea and the republic of Panama on the north, by Venezuela and Brazil on the east, by Peru and Ecuador on the north, and by the Pacific Ocean on the west. The agricultural resources are abundant. The fertile valleys of the Cordilleras and the regions along the coast produce coffee, cocoa, bananas, sugar, tobacco and many other tropical fruits, but, unfortunately, agriculture is in a very backward state, even in the most populous and civilized districts. The chief products exported are tobacco and coffee. Cattle raising is carried on to a considerable extent, but there is very little done toward improving the breed of the native cattle.

Colombia possesses enormous mineral resources, gold being found in almost every section of the country, either in alluvial deposits or in the streams. At present the center of gold mining is the Department of Antioquia. The chief silver mines are in Tolima and Cauca. The richest mines are in the remote interior, and the lack of modern transportation facilities makes it almost impossible to carry on mining operations on a large scale. In transportation facilities Colombia may be classed among the most backward countries of South America. It has about 450 miles of railway, consisting of short—mostly narrow gauge—lines, running from the coast to the Magdalena River, which is navigable for about 900 miles and forms the principal waterway of the country. The roads are mere mule tracks, and the mule is the chief means of transportation in the interior, both for passengers and freight.

However, the Colombian Government has now appropriated the amount of $30,000,000 for railroad construction, and it is reported that work will soon be started.

The republic of Colombia ranks fifth of the South American countries in point of commerce with the United States, and the chief exports from this country consist of cotton clothes, wheat flour, manufactures of iron and steel, leather manufactures, mineral oils, etc.

The total foreign commerce of Ecuador amounts to approximately $20,000,000 a year, of which $8,000,000 represent imports. Of the latter 32 per cent. come from the United States. During the last twelve years the imports into the United States from Ecuador increased over 200 per cent., while the exports from the United States to Ecuador in the same period show an increase of about 135 per cent. The exports consist chiefly of iron and steel, machinery, hardware, small tools, cotton goods, wheat flour, etc.

The commerce of Bolivia, while showing some signs of growth during the last decade, is still insignificant, considering the abundant natural resources of the country. The country is rich in all kinds of mineral deposits, but up to the present time the great bulk of mining machinery and mining appliances has been imported from Europe, especially from Germany and England.

Bolivian commerce finds its outlet and inlet chiefly through Chilean and Peruvian seaports, to the value of about $19,000,000 a year. Small as this is, the bulk of it follows the Cape Horn and Magellan routes, though some of the European merchandise is imported on the Atlantic slope through Argentina. The silver and copper ores are transported principally through the port of Antofagasta, which is 650 miles north of Valparaiso.

In conclusion it may be said that the trade of the West Coast of South America is well worthy of our closest attention, and it is to be hoped that our manufacturers will take advantage of the many opportunities presenting themselves.

A WEST COAST HARBOR.

MODERN AMERICAN MINING MACHINERY.

BY GEORGE P. SCHOLL, PH.D., M.E.

It is a well known fact that the United States is the greatest mining country in the world, as can easily be proved by statistical data. In 1905 it stood in the first place in the production of coal with 352,000,000 tons, leading its nearest competitor, Great Britain, by 113,000,000 tons; while in the production of iron it exceeded the latter country by 13,000,000 tons. In the production of copper it has occupied the front rank for a good many years, and last year its total production amounted to not less than 395,000 tons, which is equivalent to 59 per cent. of the total supply of the world. Enormous quantities of the red metal are exported to all parts of the globe. The production of lead, zinc and the precious metals, gold and silver, also has reached very high figures.

Unlike Great Britain and Germany, the next largest industrial nations of the world, the enormous metallic production of the United States is obtained exclusively from native ores, wheras the former countries rely largely on imported ore. The demand for mining machinery in the United States is therefore necessarily very great, and has led to a corresponding development in the art of building mining machinery. Given the necessity of supplying this large demand, coupled with the tendency of American machinery constructors to constantly improve mechanical appliances, it was a foregone conclusion that types of machinery would be evolved which would easily outrank those made by foreign competitors.

Constructors of American mining machinery are thoroughly familiar with the work which the machines are called upon to do under widely varying conditions, and the wide range of experience thus gained enables them to adapt a particular machine to the precise conditions it has to meet in practical operation. One of the principal points to which attention is paid is to make the machines of ample proportions, so that they are strong enough to stand the rough usage which they receive at the hands of men, often ignorant of mechanical knowledge and none too careful in the handling of the machines intrusted to their care. In line with this is the constant endeavor to simplify the construction, to reduce the number of moving parts and of such parts as are liable to wear out quickly, to the lowest possible figure, and to have the parts of standard dimensions so that they can easily be duplicated and carried in reserve. It can easily be imagined how much this means to a mining man, especially in out of the way places in the mountains, who may have to wait for weeks in order to replace a broken machine part, the tool being meanwhile out of commission.

Another point about the construction of American machinery is the careful attention which is being paid to building the machines in sections, the weight of the single parts being kept down as much as possible, so that they can be easily transported, if necessary, on mule back to their place of destination. Whole mill outfits have thus been taken into out of the way places in the mountains.

In a general way it may be said that the general tendency in the construction of mining machinery today is the mechanical simplification of the apparatus, making them able to be handled more cheaply and effectively. The elimination of hand labor is carried out to the fullest possible extent, and its replacement by automatic working machinery, in order to cheapen the cost of production as much as possible, is proceeding rapidly. As an instance, may be quoted the rapid introduction into mines of the electric locomotive for hauling the materials out, superseding the old fashioned way of using hand labor or mules.

At the head of all mining machinery stands the tool which serves for winning the material to be mined, namely, the rock drill. In this branch of mining machinery America maintains an undisputed prominence. Names like the Ingersoll and the Sullivan drill are familiar all over the world, where the excellence and the good service performed by American drills have won for them the esteem which they justly merit. The air drill still stands unsurpassed by any other type at the present time in its application to mining work, but it is being hard pushed by the electric drill. The construction of these drills is a very difficult problem, and, although they have given good service in many places, they are not altogether satisfactory for heavy work. Within the last couple of months, however, a drill has come on the market which, so to speak, represents a combination of air and electricity. Realizing the advantages of both, namely, that of compressed air for operating the drill and that of electricity for furnishing the motive power, the inventor arranged his drill so that its working part is driven by compressed air, while the compressor which furnishes the air for the drill is driven by electricity. The drill is the so-called Temple-Ingersoll electric air drill, the patent having been recently bought by the Ingersoll-Rand Company, which has acquired the sole right to build the machines. The machine is shown in the accompanying illustration.

The whole outfit consists essentially of three parts, namely, the electric motor, the air compressor and the drill. The electric motor is of the standard type, either for alternating or direct current, as may be required according to the kind of current furnished by the power station. The fact that the drill can be driven by electricity allows the miner to avail himself of all the advantages which the transmission of electricity has over that of compressed air. It is a well known fact that the transmission of the latter is attended with very heavy losses, both by friction and by leakage. It is difficult to keep the compressed air line leading from the surface down into the

TEMPLE-INGERSOLL ELECTRIC AIR DRILL.

shaft, and to the various working places in the mine, always in good condition. On the other hand, the wires for the electric current can be quickly and easily put up, and can be carried anywhere where power is wanted. The losses in transmission are quite negligible, and the efficiency of the electric motors is very high. In the Temple drill the motor has two different speeds, which can easily be regulated by a simple controller, located on top of the motor, which controller can be actuated and stopped by the simple pulling of a cord by the man who operates the machine.

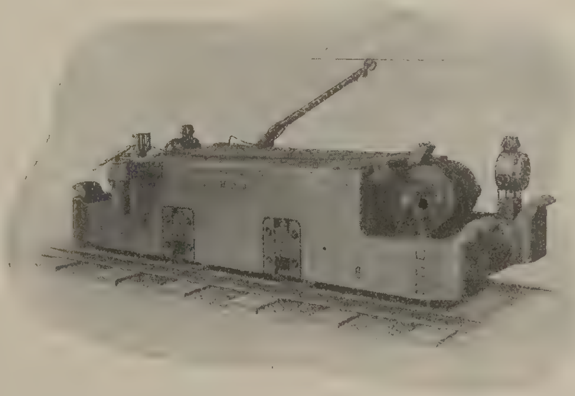
The air compressor is the principal part of the machine, and it consists of a duplex compressor, with two cylinders. The construction of the compressor is somewhat intricate, and cannot be explained in detail here, but the whole object of the apparatus is the maintenance of a difference of air pressure between the two pieces of armored hose, which lead from the compressor to the drill, and which are plainly visible in the illustration. One of these pipes is connected in front of the drill piston and the other back of the latter, and the piston moves back and forth owing to the difference of air pressure in the two cylinders, and consequently at the front and at the back of the drill piston. The characteristic feature of the drill is that it does not consume any air, as the ordinary rock drill does, but the air is simply compressed, expanded and recompressed again, etc., the only air consumed being that lost by leakage. This drill was thoroughly tried in practical operation before it was put on the market, and it has given very good results for driving long drifts in mines and for tunneling work. The drill only requires from one-third to one-quarter of the power needed for the ordinary air drill. It works very rapidly, striking about 450 blows per minute. In its mechanical details it shows great simplicity, absence of complicated moving parts, and great ease of operation. It is so constructed as to be easily adapted to transportation on mule back. With the splendid organization of the Ingersoll-Rand Company behind it, this drill is sure to become well and favorably known.

For hauling the material broken down by the drill and the mechanical coal cutters to the mine shaft or the entrance of the mine, electric haulage comes more and more into consideration and use. Considering the manifest advantages of electricity, this is but natural. Among the companies which have developed machinery for this purpose, the Jeffrey Manufacturing Company, of Columbus, Ohio, occupies a prominent place. Several types of their electric locomotives are shown in the accompanying illlustrations. Among the more recent constructions are the types which combine the rack rail and the friction traction devices. Thus on such grades where the traction by friction would not be strong enough, on account of the grade being too steep, a section of a rack rail is laid on the track. The locomotives are provided with sprocket wheels, which fit into openings in the rack rail, and thus on steep grades the advantages of the rack rail movement are realized.

It is evident that a construction of this kind offers much economy in the construction of the track, inasmuch as it is only necessary to provide the expensive rack rail on the steep grades, instead of laying it along the entire length of the track. For specially steep grades a type is constructed which has four sprocket wheels, and can haul a train of mine cars up a 10 per cent. grade.

Another construction of the Jeffrey Manufacturing Company is the electric gathering locomotive, which is intended to run right up to the space where the material is mined, and to gather the cars from the various working places at a distance from the main trolley wire. The locomotive takes its current from the trolley wire by means of a flexible cable, which is wound upon a drum carried by the locomotive. When it leaves the main tracks the end of the cable is connected to the trolley wire, the pole is lowered and the machine takes current by means of the flexible cable. Automatic devices are provided which unwind the cable as the locomotive increases its distance from the trolley wire, and when the locomotive runs back the cable is automatically wound upon the drum again in the proper manner. The manifest advantages of this type of locomotive over hauling the material by hand or mule are sufficiently clear, and their introduction into American mines is proceeding rapidly.

In this connection it is of interest to call attention to the Shay type of locomotive, built by the Lima Locomotive and Machine Company, of Lima, Ohio, which is specially designed for great hauling power in connection with heavy work in mountainous mining regions and for



JEFFREY ELECTRIC GATHERING LOCOMOTIVE.

JEFFREY ELECTRIC MINE LOCOMOTIVE.

mining railroads. The Shay type of geared locomotive has proved its excellence for this kind of work in a number of instances, and successive improvements introduced into its construction have made it still more able to perform useful and efficient service. The pistons drive a crank shaft which is parallel to the track, this shaft being connected by universal couplings and slip joints to a line shaft on each track. These line shafts drive each axle by means of bevel gears, and thus the locomotive adapts itself easily to curves and has a low center of gravity. Provision is made for large water and fuel carrying capacity.

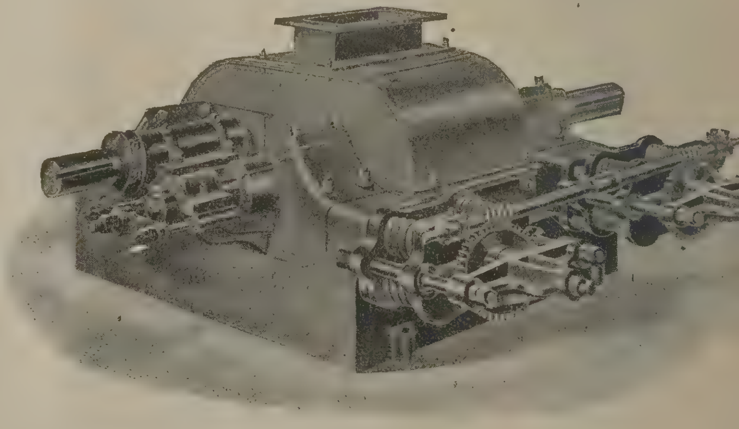
As far as the hoisting arrangements, for getting the materials out of the mine, are concerned, the old steam hoist is gradually being superseded by electricity, and the builders of hoisting equipment are putting various lines of electric hoisting equipment on the market. Among others, the Allis-Chalmers Company, of Milwaukee, Wis., long and favorably known as builders of mine and smelter machinery of all kinds, are devoting a great deal of attention to the subject, while concerns such as the Denver Engineering Company, of Denver, Col.; the Power and Mining Machinery Company, of Cudahy, Wis., and the Mine and Smelter Supply Company, of Denver, Col., are working in the same line. Much attention is paid to the development of small electric hoists, to be used for prospecting and for working small shafts in places difficult of access, where coal can either not be obtained at all at a reasonable price, or where water power is available for the economic generation of electricity. Such conditions obtain in a great many localities, especially in South and Central America and Mexico, and such types of hoists as mentioned should find favor there and repay the cost of installation many times over. The sizes of these small electric hoisting engines run from 5 horse power up, the smaller type handling a maximum load of about 1,000 pounds. They are substantially built, and especially the smaller types are constructed in very compact shape and in a simple manner, so that they can be easily moved and set up at a different place if required.

In connection with the subject of hoisting engines it may be remarked that many improvements have also been introduced in the construction of ore and water buckets and of skips, the latter being arranged for automatic dumping. The construction of ore and coal cars is also a matter to which particular attention has been paid, with a view to making them easily operated, to provide for their efficient lubrication and to carry out the dumping operation automatically. Thus one type, which has recently been put on the market by the Jeffrey Manufacturing Company, is built of heavy sheet steel, the bottom having a ridge in the middle from which it slopes toward the doors. The latter are kept closed by means of chains wound upon windlass shafts, and the doors may either be opened simultaneously or separately. The doors are opened by mechanical means. The car is built for large capacity, and gets its motive power from a trolley wire.

Properly within the domain of mining machinery belong the machines for hoisting all kinds of material for quarrying and building purposes, such, for instance, as are built by the Lidgerwood Manufacturing Company, of New York.

Constructions of this type are much used for excavating and contractors' work, and have been brought to a high state of efficiency, as far as the labor saving and cost of operation is concerned. One of the latest types is a double cylinder three drum tandem engine, built by the Lidgerwood Company, which is equipped with three hoisting lines, which are operated by only one man. The drums are so arranged that they may be operated independently or they may all be working at the same time, hoisting, lowering or swinging loads. This type of engine is also fitted with the Lidgerwood swinging gear. An apparatus of this kind is especially suitable for large operations, where heavy loads have to be cheaply and quickly dealt with, and it should recommend itself to the consideration of intending purchasers.

American manufacturers have also achieved a high standard in the construction of ore crushing machinery, and they are constantly introducting improvements tending to facilitate the manipulation, to increase the crushing efficiency, and to reduce the wear and tear on the machines. In matters of this kind experience in the building of mining machinery and the performance of the machines under a great many different conditions and with widely varying classes of ore is absolutely essential, as a machine adapted to crush one kind of ore is almost sure to fail when used for ore of a different character under the same conditions. Owing to the varied nature of the ores in the United States, the American manufacturers



TRAYLOR CRUSHING ROLLS.

have gained the experience above referred to, and American crushing and ore concentrating machinery has gone and is still going to all parts of the world. It is being recognized that for strength and durability, for cheapness of operation and efficiency, it can easily hold its own when compared with European products.

In general the improvements in ore crushing machinery are not directed toward the introduction of radically new types, but rather to the perfection of details. Thus the standard types of gyratory crushers, such as the Gates, the McNully, the Austin, etc., are still the same in their essential features, the improvements made relating in general to making the constructive parts of the machines more easily accessible, to prevent the heating up of the bearings by making them of ample proportions as well as to increase the strength and rigidity of the machines by making the parts of large size, so as to enable them to stand the great strain to which they are subjected during the operation of crushing.

Attention has also been paid to the easy regulation of the adjustment and to the dimensioning of the feed openings, so that the machines do not become clogged. The well-known Gates crushers, built by the Allis-Chalmers Company, are provided with a feeding device, the so-called spider, which has only two openings instead of three, and increases considerably the feeding facilities. These gyratory crushers have a very large capacity, up to 300 tons and more per hour, according to the size of the crushed material required. On that account they are the most useful machine for dealing with large quantities of material, not only in mining work but also in cement works and for quarrying purposes, as well as for contractors in railroad work, road building, etc.

The well-known types of jaw crushers, such as the Blake and the Dodge type, continue in favor for mining work, and they are preferred to the gyratory crushers, though they have a much smaller capacity where the question of a limited initial expenditure of money is concerned or where a small machine is required which has a large opening and the capacity is not so much of a factor. The two above mentioned types effect the crushing of the material betwen two jaws, one of which is stationary and the other movable. In the Blake type the movable jaw is pivoted at the top and in the Dodge type it is pivoted at the bottom. The improvements in them relate also essentially to details, such as the adjustment, the material for the removable jaw plates, etc. Both types of machines are used in large numbers and have found their way from their American home to all parts of the world. Both of these types are made by several concerns, notably the Allis-Chalmers Company, in sections (no piece weighing more than about 350 pounds as a maximum), for transportation on mule back to localities difficult of access. Repair parts are, of course, easily obtainable, as the machines are of standard sizes.

A very substantial crusher is designed and put on the market by Mr. C. G. Buchanan, New York. It is built by the well known Geo. V. Cresson Co., of Philadelphia. The crusher consists of but few parts, and is built very strong; it can easily be adjusted, and the wearing parts can be used on both sides. The machine finds a wide range of application all over the world, especially for hard rock.

Crushing rolls are still finding many supporters and form an invaluable machine in many instances. The modern types show a decided improvement over the older ones in regard to the ample proportions given to the shafts and to the rolls, the mechanism provided for maintaining the necessary amount of pressure between the rolls, and the roll adjustment. In order to give an idea of the construction of a recently designed type of rolls, it will be sufficient to briefly describe a type put on the market by the Traylor Engineering Company, New York. These rolls are shown in the accompanying illustrations. The rolls are provided with mechanical means which allow of easy adjustment of their relative position from the side as well as from the end. The side adjustment serves to keep the faces of the rolls even, in order to avoid the forming of grooves due to the wear on the roll. By this means the life of the roll tires is considerably increased, and consequently a much greater crushing capacity is obtained from a given weight of tire. The end adjustment of a pair of rolls is a matter of considerable importance, and with the older types more or less trouble has developed because the movable roll did not move evenly with both its sides at the same time, which resulted in its being closer to the stationary roll on one side than on the other; consequently there was not only a considerable loss of capacity, as well as efficiency, but the bearings heated up owing to the unequal pressure upon them. In the Traylor rolls the mechanism shown in the front of the illustration represents the method by which the moving of the roll is accomplished, and in order to perform this operation it is only necessary to turn the crank one way or the other. The worm wheels on the shaft which is turned by this crank then turn the wheels on the adjusting worm shaft so that the movable roll goes ahead or back as desired. The tires used in this roll are made of chrome steel, which is a more durable material than ordinary steel. The bearings of the rolls are made of ample proportions, and provision is made for efficient lubrication.

As far as the Huntingdon and Chilean mills are concerned, the favor with which they are regarded by mining men speaks eloquently for the work they are doing in practical operation. Both these types of machinery are used all over the world, and American built types have well earned their reputation. The improvements in these machines within recent years also relate to the perfection of details, in order to facilitate the operation, decrease the wear and tear, and with it the cost of repairs, and make the machines more efficient and of greater capacity.

Another type of machine which has recently come into favor and is doing efficient work as a fine grinding machine for ores is the tube mill. This consists essentially of a long sheet steel cylinder, lined with either chilled iron, manganese steel or silex bricks, the latter being usually 2½x4x8 inches in dimensions. It is filled nearly half full with flint balls, about 3½ inches in diameter, and

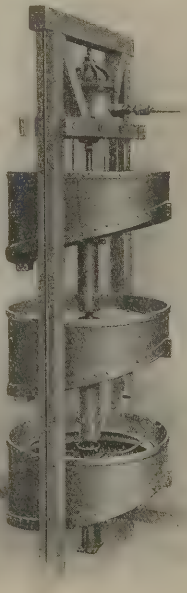
AMERICAN TUBE MILL IN SOUTH AFRICAN MINE.

revolves around its axis about 25 to 30 revolutions per-minute. The ore or other material, the mill being used extensively also in the manufacture of Portland cement, is fed in at the end of the mill and gradually passes forward, being ground fine between the pebbles and the latter and the lining in its forward movement. The accompanying illustration shows a type of tube mill built by the Allis-Chalmers Company, the installation being in operation at one of the large mines on the Witwatersrand, near Johannesburg, Transvaal. This type of mill has given good satisfaction in the South African field and is finding much favor. By its use it has been possible to get a much better saving in the treatment of gold ores, so that the mills will pay for themselves in a short time. These mills are also adopted in West Australia and in Mexico, and their use will no doubt increase considerably. Another type, the Abbé tube mill, made by the Abbé Engineering Company, New York, shows a similar design as far as the tube of the mill is concerned, but the feed arrangement is altogether different, as well as the support. Whereas the Gates mill (Allis-Chalmers) is supported at the ends in journal bearings, as shown in the illustration, the Abbé mill is supported by means of two tire rings located near the front and the end of the mill on two friction rollers, and the motion of the latter revolves the mills. This type is also in operation in Mexico. An efficient type of tube mill is also designed and built by the Denver Engineering Works, of Denver, the mills being installed at various places in the West and giving good satisfaction.

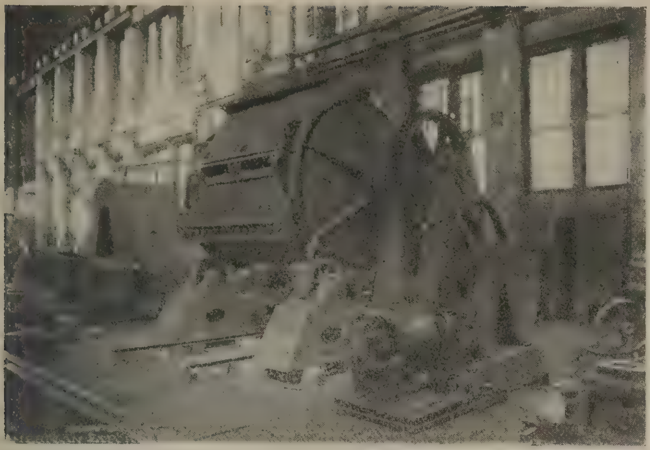
Screening apparatus are also an essential factor in mining and mill work, and are used on an extensive scale. The old-fashioned rotary sieve has held its own for many years, and is still doing good service. Within recent years, however, it has been superseded in a good many cases by another type of machine, the so-called centripact screen. This machine, which is shown in one of the accompanying illustrations, is built by the Traylor Engineering Company, of New York. The illustration represents a so-called triple unit, three screens being arranged one above the other. The screen part is shown removed from the lowest screen. The screen part is saucer shaped and is mounted on a vertical shaft, which rotates at the rate of about 30 revolutions per minute. The shaft and screen also receive successive vertical impacts, about 600 per minute. The material is fed to the screen from above, the feed arangement being arranged at the center. The action of the screen is thus a two-fold one, namely, that under the influence of centrifugal force, whereby the material fed upon the screen passes gradually from the center to the periphery, and the second one under the influence of the successive impacts, whereby the finer material is forced through the screen. The material which is too large to pass through the screen passes over the side, and is recrushed or treated further in another apparatus. The impacts also have the important function of keeping the screen open and preventing it from clogging. The advantage of this is realized when the troubles due to clogging in other types of screens are taken into consideration. The screens are built for dealing with any kind of material, either wet or dry, up to 100 mesh material, and they screen wet without the addition of a further quantity of water. The screen has given good service in practical operation.

American ore-concentrating machinery continues to maintain its high standard of efficiency. The well-known Wilfley table, which has gone all over the world, has been improved in various ways, especially in the mechanism of the table movement and support, as well as by the addition of a device by which the so-called "middlings" are automatically returned to the table for retreatment. Middlings are that product which stands between the concentrates containing the valuable minerals in the ore and the worthless gangue, the "tailings," and by retreating them a further percentage of the values in the ore is saved.

One of the most recent table constructions, and which has given much satisfaction, is the so-called Card table, made by the Hendrie & Bolthoff Manufacturing Co., of Denver, Col. This table differs essentially from the Wilfley in that it has no riffles on its upper surface, but has a series of parallel channels. These channels



CENTRIPACT SCREENS.



COPPER CONVERTER.

are cut into the deck and are of triangular form, one side of the triangle sloping down gently and the other steep. The channels are broad and deep at the feed end, and gradually get more narrow and shallow toward the discharge end of the table, where they taper to a point. It is claimed that the process of separating the valuable minerals in the ore from the worthless gangue is more even and undisturbed on this kind of table. The author has in a number of instances seen these tables used on very finely pulverized material, and the work done by them was very satisfactory.

Smelting machinery is another branch of the subject under consideration in this article, in which American manufacturers have attained a high state of perfection and in the development of which they may truthfully be said to have led the world. The same applies with equal truth to stamp milling machinery, so that American stamp mills are found in all parts of the globe. The five-stamp battery still forms the unit, and has been improved in various details, such as cam shafts, tappets, foundations, shape of mortars, etc. Some of the modern mills have battery frames of structural steel, which have replaced the wooden frames used formerly.

Electricity as a motive power for stamp mills and smelting works is making rapid strides, and is being adopted more and more. The accompanying illustration shows, for instance, a large copper converter, built by the Allis-Chalmers Co., which is tilted up and down by means of the electric motor shown alongside.

In conclusion it may be remarked that the brief outline of the large subject of mining machinery attempted above is necessarily incomplete, but it shows nevertheless that the high standard and efficiency attained by American manufacturers are being successfully maintained.

A device lately introduced into stamp mills which treat gold ores by amalgamation, that is, by passing the ore in the form of a thin, watery pulp over inclined copper plates covered with mercury, the latter catching and retaining the gold, is the Pierce gold saving riffle, constructed by L. V. Pierce, of Denver, Col. The author saw this device in operation in several mills in the West, and it was giving good satisfaction. It is essentially a small rectangular box, provided with a series of parallel upper and lower riffles, the latter being made of copper and amalgamated on both sides. The bottom of the box contains mercury.

In operation the pulp containing the gold passes underneath the upper riffles and over the lower ones. It first fills the apparatus to the top of the first upper riffle, then passes under, between it and the first lower riffle, then up between the first and second upper riffles to the top of them, then down to the next lower riffle, and so on, so that the gold bearing pulp comes into intimate contact with both sides of the amalgamated plates and the mercury in the bottom. By this operation the gold adheres to the riffles and is caught in the mercury, and a certain amount of gold is obtained which would otherwise be lost. The apparatus is usually located at the end of the stamp battery plates, so as to save any gold not retained on them. It is easily installed and may be mounted on wheels if desired.

As far as the general design of modern stamp mills is concerned, it may be remarked that structural iron and solid, substantial cement floors are being employed in the modern mills to a much greater extent than formerly. The improvements in the construction of stamp mills all tend to the better efficiency of the apparatus, to the closer adaptation of the machinery and all appliances to the character of the ore under treatment, so that a better saving of the valuable constituents of the ore is obtained. Efforts are made to arrange the various machines in the mill in such a manner that the labor of supervision is simplified and the amount of labor required is reduced to a minimum. At the same time the various apparatus are so arranged that they are easily accessible for repairs and inspections, which also reduced the cost of labor required to attend to them.

The modern American stamp mill, as a whole, is a well-designed, solidly-built structure, and arranged, as stated above, to do the maximum amount of work with a minimum amount of labor, and to obtain the greatest possible saving of the valuable materials in the ore. On that account it will recommend itself to intending purchasers. American built stamp mills are found in every quarter of the globe, and the efforts made by their builders in adapting them to the requirements of modern practice will ensure their standing at the head of foreign competitors, as they have done heretofore.

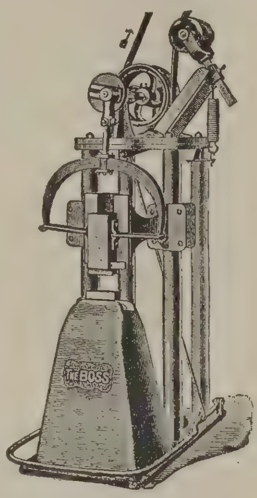
The Regina Arc Lamp Works, of Sülz-Cologne, Germany, recently received the fourth order for its Regina lamps from the Electric Company, Tsingtau, and the Imperial Government of Kiao Chau, the order calling for 126 lamps. This is an excellent recommendation for the superior construction and efficiency of these lamps, which are now used in the Orient in very large numbers.

The Reginula lamp is said to be the most solid miniature lamp on the market, as the regulating part is included in a brass body—in the same manner as in the Regina and Helia lamps—so that no working part can be disturbed by any outer influence.

IMPROVED POWER HAMMER.

The belt hammer has become not only a valuable but an almost indispensable machine in every large general repair and blacksmith shop, in wagon and buggy factories, coal mines, gold mines, shovel factories, etc. The one illustrated herewith has superior and unusual features that have won for it widespread recognition in both this and foreign countries. It is simple in design, but possesses great strength and durability. The frame is so constructed as to provide working room of unusual dimensions, which permits of forging material of any length and extreme width. The anvil is a separate casting from the main frame of the machine, and therefore absorbs the full force of the hammer blow, without in any manner causing jar or strain upon the machine proper. The hammer-head is milled from a solid bar of mild steel, and is accurately planed to fit the guides and hammer die. The guides are planed and firmly attached to the guide-yoke, having an overhang so as to admit of forging material to the center of a 24-inch circle. The dies, which are of steel, always strike parallel upon all thicknesses of material. They will work to the center of a 24-inch circle, and will accommodate material 3½ inches thick extending through the frame, or 6 inches thick lengthwise of the dies.

There are very few belt hammers which are not operated by means of the old standby—the leaf-spring. This form of spring is easily repaired or renewed by any blacksmith, and has the great advantage that the tension may be changed by reducing, or adding to, the number of leaves. The makers of this machine, like the majority of hammer manufacturers, have clung to the leaf-spring, which has done such good service in locomotives, buggies and many other every-day devices.



BELT HAMMER.

The telescopic pitman, which carries the spring containing the hammer-head, is said to be a novel feature peculiar to this particular hammer, and admits of forging material of different thicknesses, without in any way interfering with the stroke of the hammer, the speed or force of the blow.

It will be noticed by referring to the cut that the crank-shaft bearings are far apart, which prevents the same from easily becoming out of line, as is liable to be the case when the shaft space is short and the bearings close together.

The drive-pulley is provided with widened flanges having smooth, true surfaces, which engage with the friction or brake-block. This arrangement provides for the greatest possible leverage upon the pulley, which may be stopped instantly with but little power exerted by the brake-spring.

A valuable feature of this hammer is the tightener pulley support, which slides in a socket and allows of taking up stretch of the belt without in any way changing the position of the foot lever or brake. It is often the case that a belt will act differently with the changes of the weather, and this adjustable tightener brings the machine at all times under perfect control of the operator, and the foot lever is always in the same position, enabling the operator to become an expert in the use of the machine. It will be noticed that the tightener pulley does not overhang from its lever, but is supported at both sides, revolving upon a stationary shaft. With this arrangement the belt will stretch evenly on both edges. The tightener and brake are reversible, which admits of placing the hammer on either side of the line shaft, without turning the machine in opposite directions.

This hammer, which is manufactured by the Novelty Iron Works, of Dubuque, Ia., is suitable for dressing plow lays, harrow discs, cultivator shovels, welding axles, tires, bridge rods, etc. Only one horse power is required, which may be in the form of a tread or sweep horse power, gasoline engine, or in fact any sort of light power. The machine measures in height 6 feet 5 inches, and occupies a floor space of 24x44 inches.

AN AFRICAN CONVEYER INSTALLATION.

The cyanide process whereby gold is primarily separated from loose sand and rocks, in which it is naturally found in minute particles, consists of tanks for chemically treating the whole mined product and means whereby the residuum of sand and rocks is disposed of after chemical separation of the gold.

Where this process is carried on to the extent of hundreds of tons of material per day many tanks of great dimensions are required, combined with conveying machinery, whereby the raw material is not only handled to the tanks, but the residuum of sand and rocks is also carried to waste places, where, in a very short time, it accumulates in piles of great magnitude.

This latter statement applies particularly to the gold fields of South Africa, where the cyanide process is much used, and especially to the largest known plant of its kind—the recently built joint plant of the Knights Deep (Ltd.) and Simmer & Jack East (Ltd.) companies.

In the combining of those two plants much rearrangement of old material and addition of new conveyers was made necessary. It is those conveyers, furnished by the Jeffrey Manufacturing Company, Columbus, Ohio, to which particular attention is called, as in no place has the belt conveyer shown better its ability to successfully handle gritty and heavy material and carry it to great distances than it has in this instance.

In the joint plant a space 170x470 is occupied by forty tanks, each 40 feet in diameter by 9 feet deep, arranged in four rows of ten tanks each, known as treatment tanks. Over these tanks are situated sixteen similar tanks known as collecting tanks, which are placed concentric with treatment tanks Nos. 4, 5, 6 and 7 of each row. Over the treatment tanks and below the collecting tanks there are four 20 inch rubber belt conveyers, one over each row, driven by separate motors. These conveyers distribute the material from the tanks above to those below as material is ready to be treated.

Beneath each of the four rows of treatment tanks and directly under the four conveyers above mentioned there are four 20 inch rubber belt conveyers, each 426 feet centers, running over three pulley troughing idlers, 4 feet centers. These conveyers are fed residuum of sand and rock, through a small opening in the center of the bottom of each tank, and carry same to one end of the rows of tanks, delivering it to two cross belt conveyers at right angles to the ends of the first four conveyers. These cross conveyers face each other, the first carrying the refuse from the first and second of the tank conveyers to the head of the third tank conveyer, while the second cross conveyer takes the four tank conveyer material to the same point, thus concentrating all the refuse at one point. The refuse being thus collected from the treatment tanks at one point and on one level, it is then delivered to a 30 inch rubber belt conveyer, which, in carrying the refuse on 310 foot centers, elevates same 20 feet into a 50 horse power motor house at the head of the conveyer and at the foot or edge of the dumping grounds, as shown in the accompanying illustration.

DUMP CONVEYER SYSTEM USED IN MINING.

At this point the material is delivered to the eighth and longest belt of the system, a 30 inch 6-ply, 3-16 inch rubber covered Century belt, 430 foot centers, which carries the refuse to the top of the dump or refuse hill, as shown in cut, a difference in elevation of 122 feet from the first four conveyers under the tanks. Having reached the top of the refuse hill, the sand and rock are delivered to the ninth conveyer of the same make as the incline conveyer, except that same is now but 125 feet on centers, and is built on a horizontal portable wood frame, thus making it possible by the gradual shifting of this frame, in the extension of the conveyer head from the incline conveyer; besides the moving of same in an almost complete circle about the head of the incline conveyer, to gradually build a plateau out from the top of the original hill or pile. As the work of moving this portable conveyer is too cumbersome a work to perform daily, there is placed at the head of this last conveyer what is known as a distributing boom of two 36 inch belt conveyers, all self-contained within a portable steel frame or structure. The first of these conveyers is merely a 30 foot extension or advance of the last conveyer, shown in the upper left hand corner of the illustration, while the second conveyer of the boom on the 56 foot centers is placed in the boom at right angles to and back of the advance belt. This last boom conveyer is on rollers in the steel frame, so that it can distribute material 56 feet to either the right or left of the structure, being fed through a threeway hopper capable of placing material to the advance belt or to the right or left on the cross belt. In time it is intended to extend the ninth conveyer, feeding boom, from 125 foot to 450 foot centers. Thus it can be seen that with the present dump conveyer system a plateau an eighth of a mile in diameter and 120 feet high may be built before it will become necessary to change the present system of conveyers leading to the top of the refuse hill.

CHURN DRILL IN MINING.

Probably one of the most important adjuncts in the success of American mining methods has been the development of the modern prospecting drill. This alone has reduced mining to an exact science; since, if it were not possible to estimate the value and extent of the ore to be excavated, it would be impossible to economically work the deposit. Furthermore, upon the preliminary survey depend the size of the working plant, the number of men to be employed, the class of machinery to be purchased and many other items important to eventual success.

There are two methods in use for making the preliminary surveys. The first is by means of the diamond core drill, and second by the use of churn drills. The former has the advantage of bringing to the surface a solid core showing accurately the character and value of each vein or ore deposit. The latter, however, is probably the most generally used, it being less expensive and enables the prospector to obtain records which are accurate enough for the great majority of cases. Another disadvantage of the diamond core drill is the fact that it requires the use of black carbons, or diamonds, for cutting the rock, and these are quite expensive in first cost and wear out rapidly, not to mention the numerous cases when they break loose from their settings and are lost. The churn drill, on the other hand, is exceedingly simple in construction and contains few parts that are liable to breakage or are costly to replace.

At first glance all churn drills look very much alike, but closer inspection will show that they differ materially in various patented appliances. We have chosen for illustration in this article one of the most improved machines of the kind in use, representing as it does the latest American practice in prospecting drill manufacture.

These drills consist of a walking beam supported on a four wheeled wagon and driven by a steam engine. The

walking beam raises and drops a heavy forged steel drilling bit, consisting of a rope socket, jars, auger, stem and bit, suspended by a rope cable. When the walking beam is put in motion the drill is alternately raised and dropped and so cuts its way through the rock. This walking beam is only used for drilling in rock, however, and when tools are being withdrawn or lowered, or pipe being driven, as is often done to prevent soft earth from caving in and filling up the hole, the walking beam is so arranged as to be entirely out of the way.

Before machines such as these were thought of for use in connection with prospecting they had been used for oil well drilling in Pennsylvania and Ohio; also for drilling artesian wells all over the country. Even now there are probably more machines sold for this class of work than for any other. It was necessary, however, in drilling holes to frequently pump out the "sand" or mud which accumulated in them, and it was found that this material gave an accurate record of the composition of the rock drilled through, and could be used most advantageously for prospecting.

The material thus brought to the surface is called the "core" and is extracted in the following manner. A piece of 4 inch pipe about 8 feet long, known as the "sand pump," in which is a rod or plunger that fits the pipe closely at its lower end, where there is a valve, is inserted in the hole. The plunger is then raised suddenly, upon which a vacuum is formed and the material in the hole is drawn through the foot valve into the interior of the pipe. This is repeated until all the material is thought to be in the pump. The pump is then extracted from the hole and the contents caught in a panner to be thoroughly examined for mineral.

In prospecting a property it is first necessary to lay out the ground systematically into 5 or 10 acre squares, a few holes being drilled to determine if the deposit of mineral is scattered over a large area or confined to a narrow vein. If the former is found to be the case, a hole is drilled at the centre of each square and each foot of depth is pumped and panned, the gold, if gold be the mineral which is being prospected for, being estimated as carefully as possible.

Upon the records obtained in this manner it is possible to estimate the direction, extent and value of a vein or ore deposit in advance of development by regular workings.

There are other uses for churn drills in mining, however, aside from prospecting. It is often necessary to drill for water and the churn drill is the most economical and rapid of all types of deep well drills for this purpose. It has the further advantage of being mounted on a carriage which is often equipped as a traction engine and may be moved from place to place under its own power.

The manufacturers of the above described churn drill, the Star Drilling Machine Company, of Akron, Ohio, have recently placed on the market a portable drilling machine which has some decided advantages over ordinary machines designed for the same purposes. It was the object of the manufacturers to produce a machine so simple in construction that it could be used in the most isolated districts without danger of its being laid up on account of repair parts being difficult to obtain. In the construction of the machine all complicated parts have been eliminated, and there are no gear wheels or other breakable attachments to get out of order. In fact there are scarcely any parts in the construction of the machine which, if broken, cannot be repaired on the ground, and the machine is so simple that practically anyone can run it. This last is an important consideration, as the supply of experienced well drillers is very limited, and it is obvious, therefore, that if good work is to be obtained the drilling machine must be of such construction that it will not get out of order when entrusted to the care of inexperienced labor.

Another important consideration in the purchase of a drilling machine is that of transportation. In South American countries it is often necessary to move a machine across deserts, and for this reason it is necessary that the machine be so built that it can easily be taken apart and re-erected after being carried on the backs of burros. One of these machines was recently moved twenty miles across the deserts of Peru in this manner, and upon being re-erected operated perfectly and continuously for many days, thus demonstrating the capacity of these drills for operating at a considerable distance from a base of supplies.

A final point of interest to South American purchasers of this class of machinery is the method employed in the boxing and shipping of the machines. The most exacting care is used in boxing the drills, so that all parts will arrive at destination in perfect order, ready for instant assembling. A great many of this company's machines are now being used in South America for sinking water, oil and gas wells and for prospecting mineral lands, and the demand for them is constantly increasing.

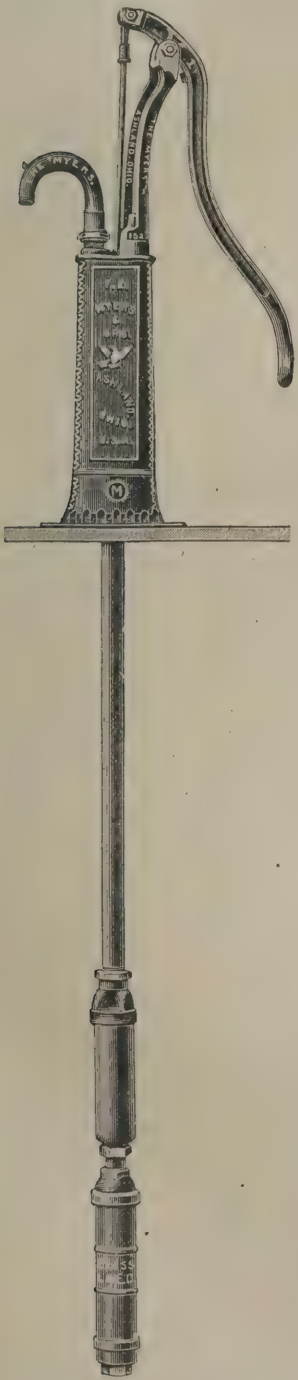
KEYSTONE DRILLER COMPANY'S NEW YORK OFFICE.

To facilitate the handling of its large and rapidly increasing export business the Keystone Driller Company, Beaver Falls, Pa., has opened up an export office in New York City. The company announces that its sales of portable well drilling machines in South America, South Africa and Russia have grown at a remarkable rate, and this fact, together with the large increase in the volume of trade coming direct from the city of New York, has justified it in opening up this Eastern office. The address of the company in New York is 170 Broadway.

During the year just closed the exports of windmills from this country represented a value of over $425,000.

SUBMERGED CYLINDER DOUBLE ACTING FORCE PUMP.

The accompanying illustration represents a double acting force pump which is said to be one of the most perfect pumps of the kind in use, its construction embodying all the valuable features and newest improvements found in this class of machinery. It is adapted to any and all wells from a 4 inch hole up, and from a cistern to a 75 foot well. In placing the pump in a 25 foot well or less it is treated as a shallow well pump, and when placed in a well of greater depth the lower cylinder can be detached and placed in the bottom of the well, and connected by pipe and rod the same as any deep well pump.



FORCE PUMP FOR SHALLOW OR DEEP WELLS.

In construction the pump is strong and durable, and it operates with ease in wells of great depth. It is equipped with the latest improved glass valve seat, which is non-corrosive and will not harden the leather. The cylinders are brass lined, which gives them great strength and wearing qualities. The spout of the pump is attached with a union, and can be turned either to the right or the left, and in this way adapt the pump to almost any direction. The stand is heavy cast iron and steel, and the entire inside of the same is utilized as an air chamber, giving a much larger air chamber than is ordinarily found in force pumps. The discharge pipe is suspended in the air chamber and extends to within one inch of the bottom. This discharge pipe, being surrounded with air, prevents freezing.

The upper or plunger cylinder is suspended in the main cylinder with an annular waterway. This construction allows the water to pass up on all sides of the plunger cylinder, and is a direct flow from the cylinder, having no crooks or turns to cause friction. The connection is broken between the cylinder and spout at the air chamber, hence the water is pumped into the air chamber, and air forces it out of the spout. By this means a perfectly even flow is obtained, no matter how rapidly the handle is worked.

The advantages of a double acting force pump on the farm or in the village are beyond question, as it is not only an ever ready protection against fire but is of the greatest advantage in washing buggies, wagons and windows, conveying water to distances, etc. With a three-way attachment, water can be had not only at the pump alone but can be conveyed to one, two or more points at any distance from the pump for stock watering or other purposes. All that is necessary is to lay the pipes to the required place.

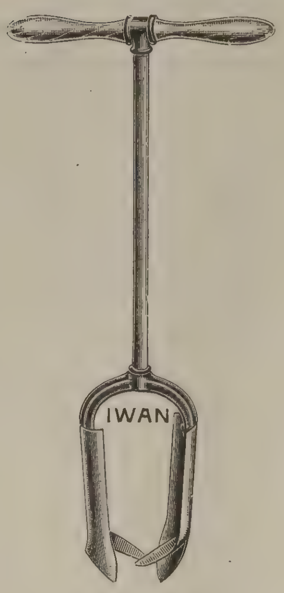
The construction of this pump, which is made by F. E. Myers & Brother of Ashland, Ohio, causes it to throw half of each stroke to the handle, thus utilizing both upward and downward stroke and causing the pump to work easier and more satisfactorily. The use of a stuffing box, which invariably causes friction and leaking, is done away with, the plunger taking its place, and the method of packing is such that the plunger is always well lubricated. Another advantage, the plunger is "cup shaped," and pressure causes it to expand and prevents leaking.

The makers of this pump are large manufacturers of double acting force and lift, hand, windmill and power pumps, also a complete line of hay tools, including hay carriers, hay forks, steel tracks, pulleys, slings, etc. Their various tools and implements are used in all parts of the world and are everywhere recognized as standard. For many years their pumps and hay tools have been awarded highest prizes for superiority at prominent expositions and State fairs held in different parts of the country.

IMPROVED POST HOLE AND WELL AUGER.

While the old-fashioned manner of digging post holes with a spade is effective enough in its way, it is a method very little adopted in the present day, the spade having been replaced by modern tools capable not only of performing such work in a superior manner, but at a great saving of time and labor. The auger illustrated herewith is said to be one of the most perfect tools of the kind in use. It was designed for all kinds of earth boring, and is adapted to a very wide range of work. It is effective in operation and remarkable for the ease and quickness with which it works.

An important feature of this auger is that it will bore with equal facility in either dry or wet soil. It takes up gravel and small stones, and will bore in all kinds of ground except solid rock. Farmers, stockmen, nurserymen, plumbers and contractors in all parts of the world have become users of this tool. Telephone, telegraph, electric light and street car companies have also found it invaluable, as it greatly lessens the labors of their construction gangs and materially facilitates the digging of post holes. The manufacturers, Iwan Brothers, of Streator, Ill., state that with one of these augers any man can bore his own well, as extensions of pipe, with couplings, are furnished with the auger if the purchaser so desires.



POST HOLE AUGER.

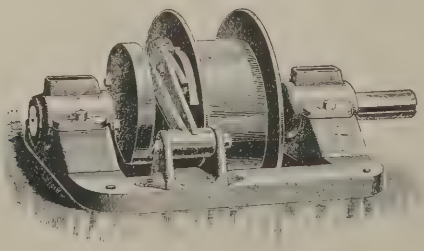
The construction of the tool is simple, but it possesses great strength and durability. Two crucible steel blades, each with two formed cutting edges and riveted to a strong malleable arch, form the bowl of the auger. The two blades interlock, having notched edges for this purpose, thus holding each other firmly in place. The auger is made in a variety of sizes, from 3 up to 14 inches. The 12 and 14 inch sizes measure 6 feet in length; all other sizes 4 feet. For ordinary purposes these lengths answer the purpose, but where deeper holes are required, longer pipe can be attached to any of the augers. A great many of these tools are now being used by the United States Signal Service in the Philippines for telegraph construction.

The augers are very easy of operation. Little pressure is needed, except in very hard, dry ground, as with the two sets of cutting blades the auger grips very quickly. It makes a hole smoothly and quickly and empties easily.

AUTOMATIC POWER SHOVEL FOR HANDLING GRAIN.

For handling grain of all kinds the machine shown in the accompanying illustration has proven one of the most economical and efficient devices for the purpose now being manufactured. It has been on the market for many years and its merits are well known to grain mill owners throughout the country. It has many features to recommend it to users of this class of machinery, and while it was primarily designed for the handling of grain it is being used with equal success in the unloading of apples and other produce.

The machine is automatic in action and when set up is as ready as the hand scoop, as the machine leaves the factory all ready for operation and requires no putting on of weights or other attachments. It takes but one man to operate it, and he has only to take a scoop into a car to any point he wishes, put it into the grain and the machine starts the scoop at once with its load to the receiver, where it stops at precisely the right point, and is then ready to return for another load; this is continued until the work is done. It is claimed that one man can unload a car of 600 bushels in from twelve to eighteen minutes. The floor space required for this machine is 2 feet 1 inch by 2 feet 8 inches long. The manufacturers, G. W. & C. A. Lane, Exeter, New Hampshire, also make this machine double on a single frame, which can be worked together or independently. With the double machine two men can unload a car of 600 bushels in from five to eight minutes. The heavy shovels are so constructed that they can be put on a line of shaft in any number, without special work on the shaft, and any one or all can be used at the same time.



AUTOMATIC GRAIN SHOVEL.

The machines are strong and durable, but are very simple in construction; there is no complicated mechanism, and because of their simplicity they rarely get out of order. They are used for a variety of purposes, such as scraping out flat bottomed bins, or over large areas of floor where grain has been spread; also for elevating sacked grain, bales of hay, etc., and can be made to work anywhere from 1 to a 50 feet run.

To meet the requirements of small dealers the manufacturers build a light machine which is exactly like the heavy one in principle, and is amply sufficient to handle up to 600 bushels of grain per hour.

NEW STEAM PLOW OUTFIT.

The steam plow outfit illustrated herewith will undoubtedly interest many of our readers, as its adaptability to all kinds of soil makes it of appreciable value to users of plowing machinery in all countries. It consists of a 22 H. P. engine, with an attachment consisting of ten 14-inch plows, and has an average capacity of fifteen to twenty acres a day. The illustration shows the machine working in hard clay soil, and being operated by an engineer, a helper and a water hauler. A demonstration of the merits of the plow is being made for the four Mexican gentlemen shown in the picture, and so pleased were they with the workings and general construction of the machine that one of their number, a resident of Durango, Mexico, placed an order for one.

The machine is strong, durable and practical, and numerous exhaustive tests have been made to prove its efficiency in performing the work for which it was designed. Its makers are the Avery Manufacturing Company, Peoria, Ill., and the particular advantage claimed by them for their engine is that it is radically different from all other types of engines for plowing, being built especially heavy, with immense traction gears, and with the important advantage of having all of the weight carried off the boiler, same being placed directly on the trucks and in direct line with the draught of the plow. This gives wonderful pulling power, and has been demonstrated to be of especial advantage, particularly when the engine is used for plowing.

DOUBLE CYLINDER ENGINE WITH STEAM PLOW ATTACHMENT.

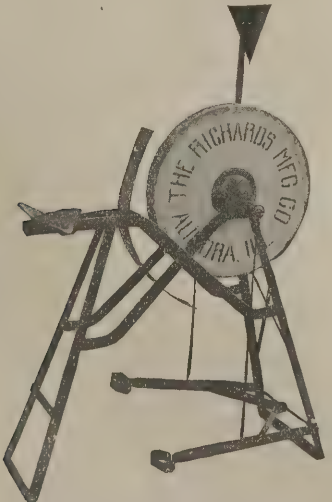
The plow is built especially strong, the frame being entirely of steel. The plow beams are made extra heavy, and are all raised at once by means of the steam hoist controlled by the engineer in the cab. The outfit is said to turn a strip of land 12 feet wide, or an average of two to three acres per hour. It has also been successfully used in extra deep plowing.

CYCLE BALL-BEARING STEEL FRAME GRINDSTONE.

In the workshop, on the farm, and in innumerable other places the grindstone has long been recognized as an indispensable tool, and the enormous demand for same has caused manufacturers to place upon the market a great variety of this class of machines. While most of them are more or less efficient in performing the work for which they are designed, comparatively few of them embody all the qualities essential to the performance of work in a convenient, easy and rapid manner. An illustration of one of the most improved and up-to-date grindstones is shown herewith. The convenience of operation and the rapid and satisfactory work of which it is capable have won for it much favor among users of this class of tools.

It is built on mechanical principles, combining strength and durability with ease of operation. The front legs of the frame are formed in one piece of heavy steel angle, and the rear legs are also formed of one piece. The upper frame is constructed to form a brace for the legs, making the entire frame unusually rigid and strong. The operation of the tool is very simple, and it is as easily pedaled as a smooth running bicycle. The Richards Manufacturing Company, New York City, are its manufacturers.

The stones for this tool vary from 19 inches to 22 inches and 2 inches to 2¼ inches in thickness, and are of the best quality Berea grit for grinding purposes. For export shipment the machine is "knocked down," making a package weighing not over 85 pounds. An illustrated catalogue describing this grindstone, also the company's full line of door hangers, may be had by anyone making application for same.



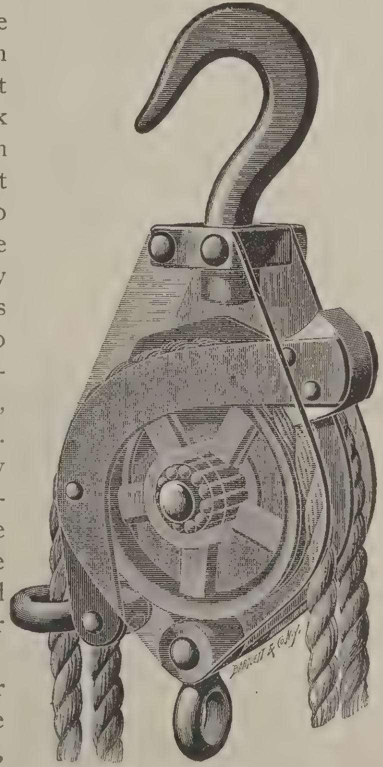
IMPROVED GRINDSTONE.

AUTOMATIC LOCK TACKLE BLOCKS.

The accompanying cut represents a type of tackle block which possesses features that have caused it to become known as one of the best devices of the kind now being manufactured. It is adapted for all positions, no check cord being required, and it will hold a load at any point.

The cut herewith shows a transparent view of the block. The case is of galvanized steel, and the sheaves are anti-friction roller bushed and do not require oil. The lock moves with the rope in acting, and does not slide over it. The grip piece, which touches the rope only when actually holding the load, has its inner side corrugated to fit the stands, thus bringing an even pressure, which does not injure it. As the lock is positively controlled by the position of the hauling rope and not by gravity, the block is equally adapted for use horizontally or at any angle.

While the operator stands near the load the lock does not operate, being held out by the



TACKLE BLOCK.

hauling rope. The load may then be raised and lowered freely. To cause the device to lock, the operator has but to step back a short distance, and the load becomes securely held in the position desired. The manufacturers, Lane Brothers Company, Poughkeepsie, N. Y., make these blocks for three sizes of rope and with any number of sheaves. They also furnish, when desired, practically the same block with lock adapted for use with a check cord.

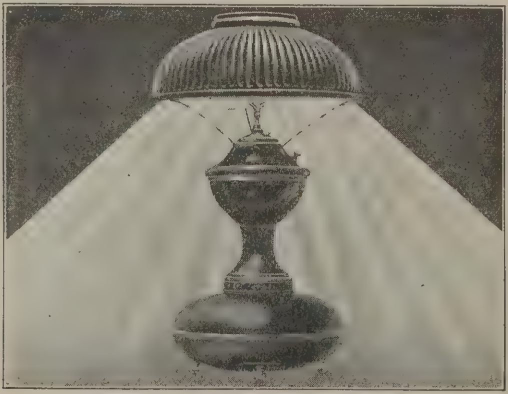
ACETYLENE LAMP FOR HOUSEHOLD USE.

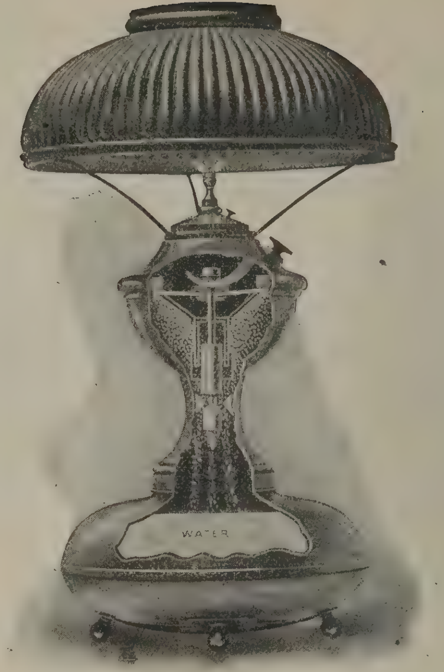
The lamp illustrated herewith was designed particularly for the household, and it combines features that make it one of the most perfect lighting appliances now in use. It is an adaptation of acetylene gas lighting, and it provides a house light having the cleanliness and convenience of gas or electricity without the necessity of piping or wiring.

It is lighted and burned from an open burner, the same as gas, and is always dry, clean and odorless. In construction it is simple and compact; there is no chimney, wick or mantle, and it is filled, or "charged" in a simple manner, without the handling of disagreeable materials. Containing its own fuel supply, it is independent of stationary fixtures, and can be moved from room to room at pleasure, and is said to be much safer than oil lamps or coal-gas appliances.

The urn is filled with calcium carbide—a dry chemical substance made from lime and coal, resembling coarse sand, but black in color. This is permitted by the interior mechanism to flow automatically in a properly regulated quantity to the water-filled reservoir forming the base of the lamp. The immersion of carbide in water generates acetylene gas.

When the light is burning the gas is consumed as fast as made; when the flow of carbide is turned off the generation of gas stops immediately and the light goes out. A very good idea of the operation of the lamp may be had by referring to the sectional view shown herewith. When the lamp is shut off by turning the thumbscrew the carbide hopper is sealed, and no more carbide can fall or gas generation take place. The manufacturers, the Acetylene Lamp Company, New York City, state that the lamp burns about nine to ten hours at full force without refilling—equivalent to three evenings of ordinary service. It diffuses a soft white light, which does not tire the eyes, although the illuminating power is more than three times that of the incandescent electric light, and more than twice that of the standard gas burner.


ACETYLENE GAS LAMP.



SHOWING OPERATION OF THE LAMP.

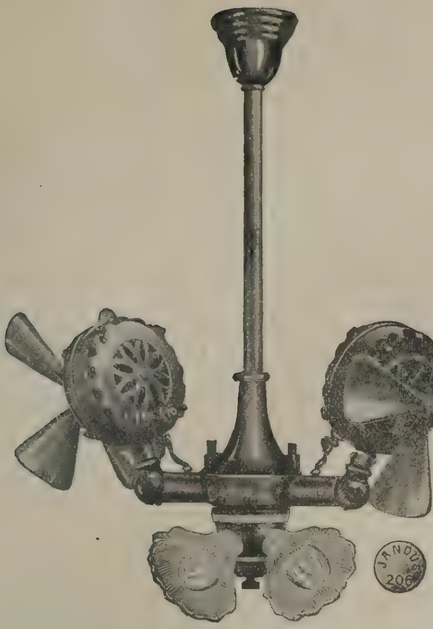
The lamp is made of brass, finely burnished, and finished in bronze. It stands 16 inches high from base to burner, and presents a handsome appearance. These lamps can be arranged with hangers, so that they may be used over a dining room table, or in stores, factories, etc.

NEW ELECTRIC VENTILATING APPARATUS.

In ventilating fans, as in all mechanical inventions for which there is a wide field of usefulness, manufacturers have been steadily making improvements, and in the construction of the fans now being manufactured a wide departure is noted from styles in use a few years ago.

The one illustrated herewith, and which is known as the Gyrofan, represents a new and distinct class of fan motor apparatus. The principle of construction differs from that of the old familiar ceiling fan, and it is said to excel that apparatus not only in beauty of design, but also in the variety and effectiveness of its work. It possesses many features to commend it to users of ventilating apparatus, and since its introduction to the public it has become widely used.

It is adapted for service in every location where a ceiling or column fan is useful and in many places where the employment of such fans is impossible. In large stores and offices where general ventilation and air disturbance are required a single Gyrofan is said to maintain a purer and better atmosphere than many ceiling



IMPROVED VENTILATING VAN.

fans. The ordinary ceiling fan throws its blast directly downward within comparatively narrow limits. The Gyrofan disturbs the air in all directions throughout a wide radius. The quietly revolving fixture carries the rapidly rotating fans around at the rate of about ten revolutions a minute, thus changing the direction of the blast continuously, but repeating it at any given point twenty times each minute.

Mechanically, the Gyrofan consists of two fan motors, pivotally mounted on a frame which is arranged to revolve about the vertical axis on a ball bearing. The apparatus is manufactured by the Jandus Electric Company of Cleveland, Ohio.

The two fans can be set to blow horizontally, or at any downward angle, and one fan can be set at a different angle from the other. The base of the fixture revolves while the two fans rotate, and the speed of revolution can be varied by a simple adjustment. The fixture can be set rigid, and the two fans arranged to throw their blast in any desired direction. The switch on the base of the fixture controls the fans.

These fans are adaptable for any and all ventilating purposes in stores, restaurants, hotels and public buildings, and are especially serviceable in banks, counting rooms, offices, telephone exchange and reading rooms, where ventilation is desired, but where loose papers, letters, etc., must not be disturbed.

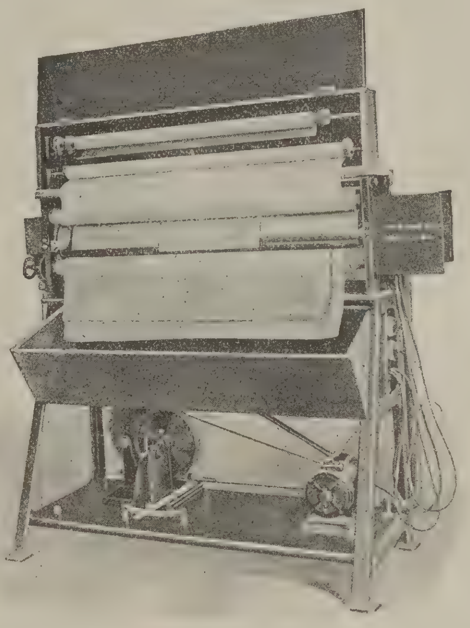
With lights attachment the Gyrofan makes a handsome electrolier, and can be so used with or without the fans in service. The switch on the base of the ceiling electrolier attachment is arranged with four contacts, so that the fans can be operated alone, the lights alone, or the fans and the lights simultaneously.

A valuable little catalogue has just been issued by the Standard Waterproofing Company, Indianapolis, Ind., which explains a method of preventing damp walls. This catalogue is neatly gotten up and illustrated with attractive cuts, and explains in detail how to prevent dampness and moisture in any porous material, whether it be cement walls, concrete or sand-lime bricks. The booklet thoroughly covers the subject of waterproofing, and will be sent free to anyone who may be interested.

NEW ELECTRIC BLUE PRINTING MACHINE.

We are indebted to the Revolute Machine Company for the accompanying cut of the Everett-McAdam Continuous Electric Blue Printing Machine, and for the following description taken from a unique blue printed circular issued by them.

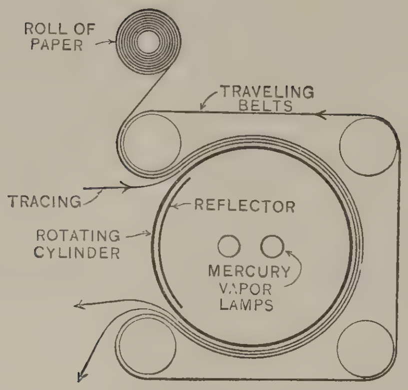
The machine consists of a rotating glass cylinder which lies in a series of narrow belts, and within which cylinder are placed two mercury vapor electric lamps. The roll of paper to be printed is placed in a box on top of the machine and feeds in continuously between the belts and the cylinder; or if only a few prints are wanted, previously cut sheets of paper may be fed in. The tracings are inserted between the paper and the cylinder, and, after passing around three-fourths the circumference of the cylinder, are deposited with the paper in a box in the front part of the machine, the printing being done from the inside of the cylinder as the paper and tracings travel around it.



BLUE PRINT MACHINE.

This machine successfully solves the problem of continuous blue printing by electric light and has many points of very decided advantage; it is the nearest thing to perpetual motion that has been brought to our attention.

It is possible to make prints five feet wide and of any length whatever, and the device is particularly adapted to making numbers of small prints on one long sheet of



SHOWING PRINCIPLE OF OPERATION.

paper or on previously cut sheets—which come out in a regular stream—and of an absolutely uniform tone.

One great feature of this continuous machine is that it is only necessary to handle one tracing at a time, the small ones being fed in side by side, while the paper feeds in automatically from a continuous roll.

The tracings go in and come out on the same side of the machine so that the leading edge of a tracing may be started into the machine again before the trailing edge comes out, saving considerable time where more than one print is wanted from one tracing. This was very nicely illustrated by making twelve prints from one six-foot tracing on a single sheet of paper seventy-two feet long without wasting an inch of paper or a second of time between prints.

One unique feature of the Everett-McAdam machine is the use of a number of one and a half inch belts instead of a single broad one. In this way absolutely perfect contact is obtained which it is not possible to obtain with the use of a single broad belt.

The lamps used are particularly adapted to this kind of work, as they give out only chemical rays—no energy being lost in non-chemical light, and as the printing is done from the inside of the cylinder, the light strikes the paper at right angles and the machine has an absolutely maximum electrical efficiency, the power required to run it being less than any other machine.

The machine is very compact, requiring a space only two feet by five feet and is entirely self-contained. It is driven by a motor and the speed can be instantly changed to any rate desired by moving a convenient lever.

Although the machine has been on the market only a year, there are forty already in daily use, proving the claims made for them by the inventors. The demand for the machines made it necessary to incorporate and start a shop for building them exclusively, and this resulted in the organization of the Revolute Machine Company, of 523 West Forty-fifth street, New York.

Mr. John M. Young, treasurer of the Williamsport Iron and Nail Company, Williamsport, Pa., will shortly leave for England, whence he will sail on February 8 for South America. Mr. Young expects to call on the wholesale trade in Rio de Janeiro, Buenos Aires, Montevideo, etc.

STEAM VERSUS ELECTRIC MOTIVE POWER.

"Large Steam and Electric Locomotives," a pamphlet just issued by the American Locomotive Company, presents a paper read before the New York Railroad Club by Mr. J. E. Muhlfeld, general superintendent of motive power of the Baltimore & Ohio Railroad. As frontispieces for the pamphlet, the Mallet Articulated Compound No. 2,400, built by the American Locomotive Company for the Baltimore & Ohio, and the electric locomotive No. 7-8, built by the General Electric Company, are shown.

The paper opens with a description of the electric locomotive illustrated in the frontispiece, giving details of design, record of its performance since going into service in 1903 and statistics of the average cost of operation and maintenance per hundred miles' run. Then follow several specifications of the requirements an electrical locomotive and its source of power should fulfill to produce efficiency and economy in railroad service. A complete description of the Mallet locomotive is given, together with a record of its performance for one year—from January, 1905, to January, 1906. Some of the results obtained from this type of steam locomotive are mentioned, and a short résumé of the requirements modern railroad motive power must fulfill is also given. In the last few pages of the paper the possibilities for electrification which some mountainous steam railroads present are pointed out, followed by a general discussion of the subject of steam versus electricity for motive power.

A NEW ARC LAMP.

The Regina Arc Lamp Factory, Cologne-Sülz, Germany, is producing an arc lamp for which many distinctive points of merit are claimed. It is put out by its makers under the name of the "Helia lamp." It is powerfully efficient as a light, and, in addition to this, is most economical in the consumption of fuel. Instead of the ordinary arc lamp burning at 110 volts with 10 amperes, the Helia lamp, already at 100 volts and 3½ amperes, gives the same light, and, in addition to this, its burning capacity amounts to about 60 hours with one upper carbon. The remainder of the upper carbon can be used again as a lower carbon, so that the carbon will be entirely used up.

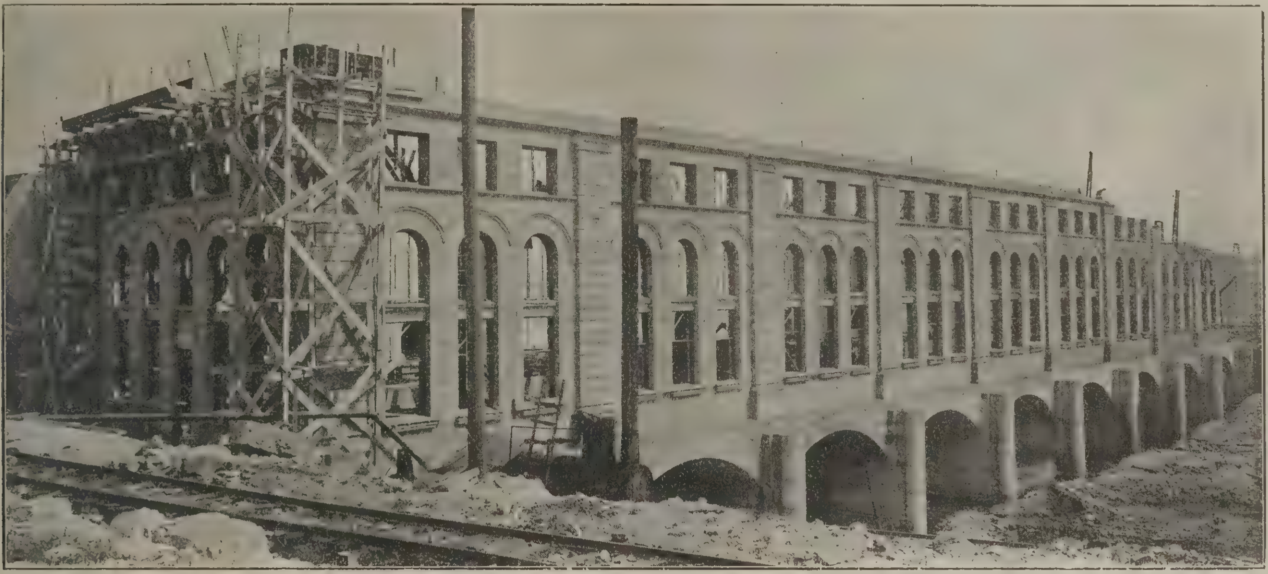
The whole length of the lamp only amounts to 500 mm. It is made for small and for great light powers up to over 1,000 c. p. Especially for alternating currents in central plants, where up to the present time an electrical arc lamp could not be employed to any great extent, it is possible to install the Helia with much success, because it burns quietly and absolutely without noise.

The lamp has no clock work or spring work. Furthermore, it is airtight, so that it is fireproof, and it cannot be injured by acids or water vapors. On account of its especially quiet and pleasant light, this lamp is particularly adapted for offices, stores, weaving mills, etc. An important feature is its natural color reflection, which renders it very valuable to silk goods concerns.

BIG ACHIEVEMENT IN CONCRETE BLOCK CONSTRUCTION.

Of the many large buildings now in course of erection in different parts of the United States there perhaps is none of greater importance, from a constructional point of view, than the splendid new power house of the Chicago Drainage Canal. The erection of this structure, which was built entirely with the system of the American Hydraulic Stone Company, of Denver, Col., represents one of the most important pieces of construction ever undertaken in concrete block work. The contract for its erection was let for $292,000, including foundations.

The building is 386 feet long, 64 feet wide and 46 feet from foundation to roof plate. All trusses and roof are carried on the walls, which are 50 per cent. hollow. No reinforcements are used, and the building was designed to house and withstand vibration of 30,000 horse power.


POWER HOUSE OF THE CHICAGO DRAINAGE CANAL.
Designed to house and withstand vibration of 30,000 horse power.

The concrete blocks used in the side walls and partitions are hollow, and the exposed faces of the blocks have smooth surfaces. This was accomplished by using a facing one-quarter inch thick, made of one part Portland cement and two parts sand. The body and face of the block were made at the same time, and received a pressure of over 25 tons.

All the blocks are true in shape, and they are of such design that over 50 per cent. of the wall is of concrete. The bond between courses is made so that no joints come directly over the courses just below it. The blocks of the exposed surfaces overlap to the depth of the course. A one-quarter inch joint, well filled with Portland cement mortar of a 1 to 2 mixture, was used, and the workmanship equals that of a first-class ashlar masonry. All of the blocks which form exposed surfaces of the wall, both inside and outside of the building, are faced with the same brand of cement and the same quantity of sand, so as to give a uniform color to the blocks. The blocks used in the interior of the walls are made of one part cement, three parts of sand and six parts of crushed stone, and all the stone used in making these blocks had to pass through a screen of three-quarters of an inch mesh.

PREVENTION OF DAMPNESS IN CONCRETE.

Probably no feature in the construction of office buildings, factories, apartment houses, bridges, residences, etc., has received more attention recently than the employment of concrete as a building material. The use of this material is becoming more general every day.

Concrete bricks have been on the market for some time; cement shingles are now taking the place of wood and slate, and concrete telegraph poles and railroad ties will no doubt soon be accomplished facts. Even stoves are now made of this material instead of iron and steel, and yet the possibilities of the material have not been approximated.

One of the greatest drawbacks to the use of concrete has been the difficulty of making it entirely waterproof. As it is very porous, dirt and dust often lodge in the material, causing it to discolor. Concrete lined cisterns have not infrequently given trouble, owing to their not being water tight. Similar fault is occasionally found with concrete basements. A great many waterproof preparations have been placed on the market from time to time for the purpose of remedying this trouble, all of which have been used with varying degrees of success. One of the most efficient of these preparations, and one which has established itself as a waterproofing of the highest grade, was brought out two years ago by Mr. G. G. Fry, of Indianapolis, Ind. Mr. Fry, who is a chemist of high ability, had been experimenting for a number of years on his preparation before he finally produced it in its present perfected form. A number of the largest concrete contractors have put it to tests in various parts of the country, under various climatic conditions, with the result that it has been accepted as a standard product of its kind and capable of doing all that is claimed for it. The company now manufacturing this product is the Standard Waterproofing Company, No. 601 West Washington street, Indianapolis, Ind.

"Standard Waterproofing," as it is called, is a liquid, and is applied to concrete with a brush, the same as a coat of paint. It is made up of millions of little particles of solid matter, which are in suspension in the liquid, and these are not even perceptible to the eye. When applied to cement these little particles go into the pores and fill them up completely, becoming as hard as the concrete itself, and making it absolutely waterproof without discoloring in the least. It is easily applied by anyone, and one coat is sufficient to entirely permeate every pore of the surface.

This company has recently issued a booklet which thoroughly covers the subject of waterproofing and which may be had by any of our readers for the asking.

A NEW SYSTEM OF CONCRETE CONSTRUCTION.

A new catalogue of much interest and value to all users of concrete has just been issued by the American Hydraulic Stone Company, of Denver, Col. This company is engaged in the manufacture of machinery for producing what is known as the Ferguson system of concrete construction, being the two-piece method of constructing hollow concrete walls.

The catalogue contains a great deal of valuable information both from a technical and practical standpoint relative to the manufacture and use of concrete blocks. Several pages are devoted to the production of specialties, such as concrete brick, paving blocks, silo, stack and cold storage construction, partition walls, veneer, lintels, sills, etc. Under the head of "manufacturing plant" important directions are given relative to the various processes necessary to make a first class product.

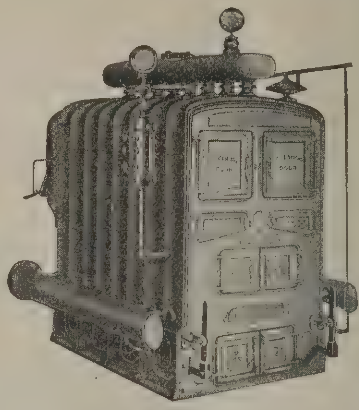
Some very remarkable tests, both as to strength and fire resistance, are next presented. The main portion of the book is occupied with the illustration of a series of concrete block buildings, and in nearly every case a letter is published from the manufacturers giving important details relative to their experience, the saving in cost, etc. The latter part of the book is occupied with a comparative statement of the one-piece and two-piece construction and an exhaustive presentation of patent matters.

The book contains 101 illustrations, and is in point of information contained, logical arrangement and general style, a distinct credit to the industry. Anyone interested may obtain a copy of this catalogue by addressing the company direct.

The exports of American automobiles during the year 1906 amounted in value to over $4,400,000, an increase of nearly 100 per cent. over the previous year. The three largest buyers were Great Britain, Canada and Mexico.

MODERN HEATING AND PLUMBING APPARATUS.

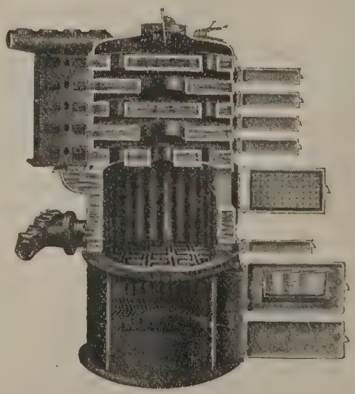
Among the great industries of America the manufacture of heating and plumbing apparatus now takes a leading position. During the past ten years remarkable progress has been made in the development of this class of equipment, and today its sale in all parts of the world has assumed enormous proportions.



SECTIONAL BOILER.

There has been, and still continues to be, an ever increasing demand for steam and hot water heating systems, these being preferable to hot air and stoves because of their convenience, fuel economy, comfort and many other advantageous qualities. The sectional boiler illustrated herewith is one of the most popular types, for general requirements, now being manufactured. It is known as the "American" for steam, and the "Advance" for hot water, the latter differing from the former only in the size of the header openings and returns. The features in design and construction that have made this boiler a favorite with architects and heating engineers may be briefly enumerated as follows:

The header construction, which affords a positive screw and thread connection with each section, is proof against leakage, and is a great aid to rapid circulation. Any section can be removed or blanked, and sections can be added to change the size of the boiler without disturbing the other sections or dismantling the piping. The grate is made in sections, and blank grates are furnished so that the size of the fire pot may be changed to suit



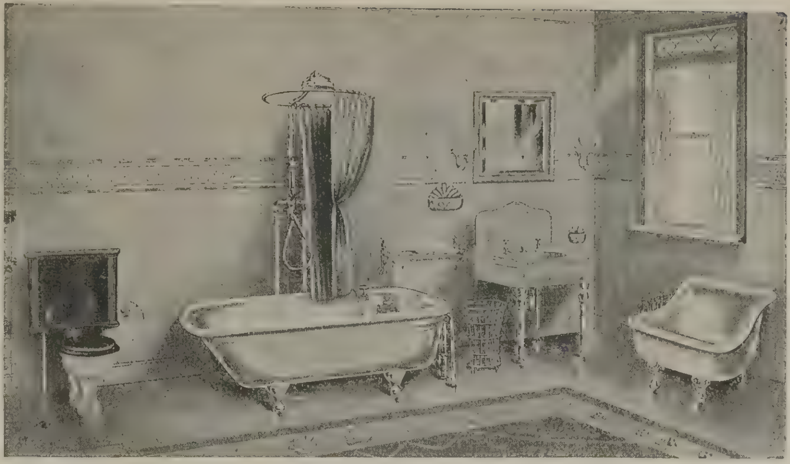
"SPENCE" HOT WATER BOILER.

requirements. A brick fire wall is furnished when desired. The grates have interlocking fingers that move easily and positively, and are very effective in crushing cinders. An extra motion of the shaking lever also serves to dump the fire if the operator so desires. The flat water surfaces and the carefully designed fire travel insure absorption of every possible heat unit before any gases of combustion reach the smoke pipe.

Another favorite type of boiler is known as the "Spence," and it is said to be the only circular, portable boiler made with a detachable water post. This boiler is designed for residence work, and is made in four different styles and some fifty odd sizes for the use of different fuels. The arrangement of the flues in this boiler is said to be the most scientific ever worked out for use with different fuels. Several important features have lately been inaugurated in this boiler that promise to render it still more unique and satisfactory. In addition to a new form of rocking, dumping grate, a second or sifting grate has been set into the ash pit. This sifting grate saves all unburned coal and affords an excellent fuel for banking the fire.

The makers of these boilers, the Pierce, Butler & Pierce Manufacturing Company, Syracuse, N. Y., operate one of the largest manufacturing plants in the United States. They began business with one type of boiler in 1883, and have so developed and increased their facilities that they are today turning out over three hundred different styles and sizes of cast iron steam and hot water boilers for use in public and private buildings, with an extensive line of cast iron radiators for every possible service:

The logical and reasonable connection between the heating and plumbing requirements has induced this company to also offer sanitary ware for bath, kitchen and laundry in connection with its extensive line of heating apparatus. The pure white, easily cleaned, American ware in either solid vitreous china or porcelain enamel has made a name for itself in all parts of the world. The solid china lavatories have also been universally adopted. They are impervious to water, and will not crack, flake or peel, and are said to be the largest pieces of china that have been cast with a 10-inch integral back.



BATHROOM INTERIOR.

ORNAMENTED WALL RADIATOR.

The company issues a series of catalogues which fully describe and illustrate the various articles of its manufacture, and any of these will be furnished to our readers for the asking.

THERMAL BATH CABINET.

Every year sees our various mineral springs and sanitariums crowded with visitors, each in some degree afflicted with one or more of the ailments that the flesh is heir to. And to the credit of such institutions it may be said that thousands of marvelous cures have been produced through their agency. Heat especially is known as one of the most wonderful remedies for purifying the body and restoring every organ to its normal condition, and as the populace is getting imbued with a better knowledge of the laws of hygiene, the value of the thermal bath as a preserver and restorer of health is becoming more and more appreciated.

To meet the demand of a large number of sufferers from rheumatism, stomach trouble, kidney trouble and other ailments, for an effective home treatment that would produce some of the beneficial results obtained at sanitariums without entailing a corresponding expense, the thermal bath cabinet was evolved.

One of the most widely known and highly recommended devices of this character is the square, screen-folding cabinet manufactured by the Robinson Manufacturing Company, of Toledo, Ohio. Its inventor, Prof. C. M. Robinson, is well known as a lecturer on natural methods of preserving health. He spent years studying and observing the power of heat and the use of mineral waters in the cure of disease, and his investigations embraced nearly every State in this country, and many of

VAPOR BATH CABINET.

the countries abroad. His thermal bath cabinet is highly indorsed by leading physicians, and over a million of them are said to be in use.

It has proven very efficient in the treatment of diseases of the blood, liver, skin and kidneys; also colds, rheumatism and kindred ailments. Its construction is simple, it folds compactly, and is very light in weight. The frame is held together by continuous goods being used, reinforced by flexible hinges. It has a regular door, with wooden standards forming a perfect joint. There are four curtains, giving four different temperatures for cooling off, which is a very essential feature. The folding top of the cabinet is made in four pieces, so that the cabinet may be heated before entering, and after the bath it can be used as a cooling room, by dropping the curtains down one at a time. The four curtains can be fastened around the body above the hips. Persons with heart trouble may take a body bath without any ill effects. In cases of rheumatism in the limbs or feet the heat can be confined to the affected parts, it not being necessary to have the entire body in the cabinet.

Another superior feature about the cabinet is the form of combustion used. It has a heating apparatus, with a flue and draft that gives such perfect combustion that not the slightest odor can be detected, and the blaze is confined so that it cannot dart around in all directions, as is the case in most burners.

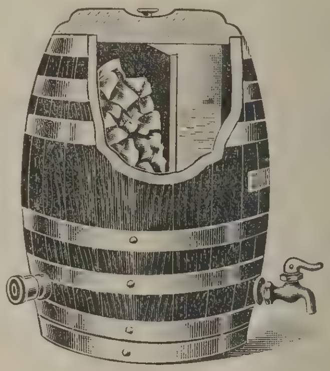
IMPROVED COMPARTMENT WATER COOLER.

While most of us take great pains to filter and sterilize our drinking water, we are oftentimes very careless with respect to the ice which melts in the water.

The majority of the water tanks now on the market are so arranged that the ice and water are together in one compartment, and the danger, in consequence, of the water becoming contaminated where the use of impure ice is employed is one of no small moment. To overcome this objectionable feature, a New York concern has invented a hygienic water cooler in which the melting ice is kept from the purified water. Each is in a separate compartment, and the water is kept at an even temperature. This arrangement has much to commend it, as, in conjunction with the filter which accompanies each cooler, it entirely precludes the possibility of germs or other impurities gaining access to the water. The marked favor with which this cooler has been received everywhere is evidenced by the large and rapidly increasing demand which the manufacturers are having for it. It is being used with gratifying results, and has been installed in large numbers in public buildings, railroad stations, private homes, river line steamers, etc.

In construction the cooler is simple but very strong and substantial, with nothing to get out of order, and the manufacturers claim it will last a lifetime. The inside is made of malleable iron, and the water compartment is lined with white porcelain. The metal parts are not exposed to the outside air, and the dead air space lying between the outer and inner receptacle makes it a perfect non-conductor, and consequently the amount of ice used is comparatively small. The tank is also equipped with an extra faucet for drawing off melted ice. These coolers are said to be excellent dispensers for fresh cream, iced tea or any light beverage, and many of them are used for such purposes in homes, on steamers, etc.

A large New York concern are the manufacturers of this tank, and the Alphonse Major Cement Company, 461 Pearl street, New York city, is the selling agent.



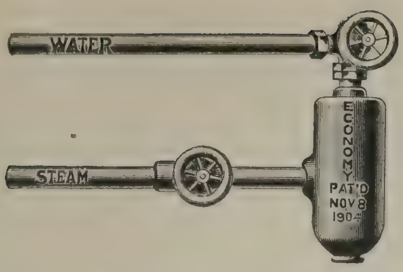
WATER COOLER, SECTIONAL VIEW.

Two and one-half, 4½ and 6 gallon sizes are made, and a suitable filter accompanies each. The body of the cooler is of Flemish oak, with polished hoops, and it makes a handsome ornament for dining room or office.

A PRACTICAL HOT WATER FAUCET.

A novel invention in the way of a hot water faucet has been produced by a Providence, R. I., concern, the simplicity and effectiveness of which have won for it marked favor wherever it has been introduced, and the demand for it has become very large. In mills, factories and manufacturing plants, where more or less hot water is required all the time, it is proving of inestimable value. Few of such establishments are plumbed for hot water, while all have steam, and this can be utilized so as to produce all the hot water that may be required.

The demand for a faucet whereby both hot and cold water can be obtained from a cold water pipe, where there is not hot water plumbing, has long existed, and in this new appliance, which the manufacturers claim is the only one of the kind on the market, this want has been supplied. Its installation in any manufacturing



NEW HOT WATER FAUCET.

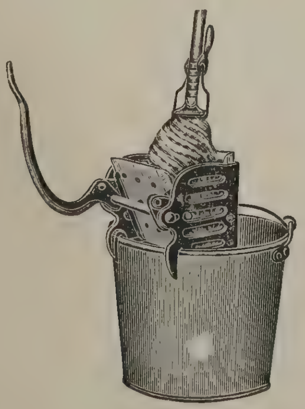
plant is productive of the most gratifying results, as in addition to much economy of time it has the advantage of being very easily and cheaply adjusted, as the usual expense for boiling tanks and pipes is entirely eliminated. The initial cost is all there is to it, as it requires no subsequent repairs.

The mechanical construction contains no working parts, consequently there is nothing whatever to get out of order. Although both hot and cold water are drawn from the same faucet, neither operation interferes with the other. The faucet takes the place of the ordinary cold water faucet, and with the addition of steam, which enters the side of the device, hot water is procured. When cold water only is required the top valve is opened; if hot water is wanted the steam valve is opened and the cold water is immediately turned to warm or hot water. Any temperature desired may be had by regulating the steam valve.

The manufacturers, the Economy Faucet Company, Providence, R. I., make these faucets in two sizes, known as No. 1 and No. 2. The No. 1 is for ordinary use for sinks; the No. 2 for washing machines and for dyers, bleachers and manufacturers who use a large quantity of water and want it hot.

AN AUTOMATIC MOP WRINGER.

The burdens of the housewife have been so materially lessened by the numerous devices which man's inventive genius has placed at her disposal that very little of the old time drudgery and weary hours of toil are her portion. It may safely be stated that few duties are more irksome, certainly none more disagreeable, than that of mopping. But here, too, as in all other branches of household work, the ingenuity of man steps in and supplies a means by which this laborious task becomes an easy and even a pleasant one. The old method of wringing a mop with the hands has been relegated to the past, and in its stead we have the automatic wringer, a device simple in construction but wonderfully efficient in saving time and labor and eliminating the many disagreeable features connected with the old fashioned manner of performing such work.



AUTOMATIC MOP WRINGER.

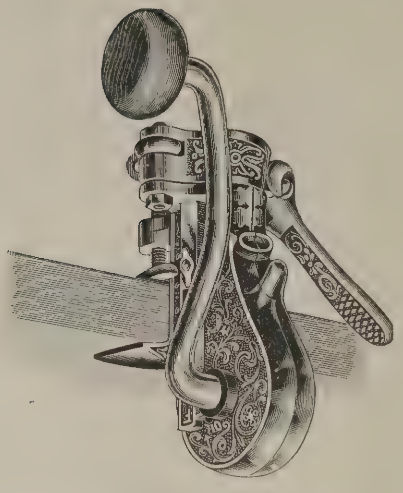
The illustration herewith represents one of the most approved and up-to-date mop wringers now being manufactured. It is a small device, comparatively light in weight, but possessing great strength and durability. The principle operating the wringer is known as the knee or knuckle joint. It is an old device and is used today in operating some of the most powerful presses made, and is unequaled for pressure. This knuckle joint connected with the loose follower is all the mechanism there is to the wringer. It has no gears, springs or rollers, but is operated wholly by levers. It is made of malleable iron and will not break or get out of order. The Lee Chair Company, Oneida, N. Y., are its manufacturers.

The use of this device entirely eliminates the necessity of wetting the hands, therefore boiling water may be used and as much soap or substitutes for soap as may be desired. There are many other advantages attached to these wringers which will readily suggest themselves to anyone familiar with the nature of the work they are designed to do. One other important feature is the automatic pressure board. It conforms to the shape of the mop, therefore it is not necessary to distribute the mop evenly in the wringer, and thus considerable time is saved. The manufacturers make these wringers in two sizes, which they style as No. 1 and No. 2. The former is for family or domestic use and the latter for hotels.

A POPULAR CORK PULLER.

The useful article illustrated here, which is the product of a large concern that makes a specialty of these devices, embodies features that have won for it almost universal favor. While simple in construction, it possesses great strength and durability, and is remarkable for its ease of operation. It has a self-centering bottle holding clamp, controlled by a single lever, and in addition to this has an attachment for removing crown seals.

In the manufacture of cork pullers the most difficult obstacle to overcome is to produce a worm of a size that will penetrate the hardest cork with ease, and at the same time have sufficient strength to withstand the severe strain exerted upon it by the mechanical action of the puller. The makers of this puller, the Arcade Manufacturing Company, Freeport, Ill., have had over twenty years' experience in the manufacture of these devices, and they state that the worms in their pullers are unsurpassed in their efficiency. They are made from the finest grade of steel, and are ground and tempered by skilled workmen, and subjected finally to the most severe tests. Every detail of the puller is worked out in the same pains-



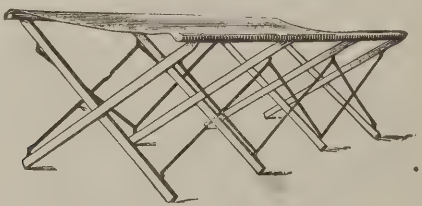
CORK PULLER.

taking way, and this fact has made the company's products the standard of excellence in all parts of the world. Its output includes cork pullers designed to meet every possible requirement in this class of work. The one shown here is termed the "Favorite," and is one of the company's heaviest sellers. It is made in two styles, one being finished in nickel plate and the other in Arcadian bronze.

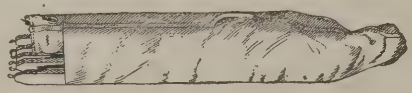
When adjusted to a counter not more than three inches of the puller is visible, all the working parts being under the counter. The method of operation is easy, and it gives a powerful and rapid stroke. By pressing the small lever the bottle is held firmly in place in the center, and there is no danger of either the worm or the bottle being broken.

A HANDY TELESCOPIC COT.

In the selection of furniture for use in camps, the features given the most consideration by the purchaser are that the articles be simple and compact in construction and easily transported from one place to another. In the illustrations herewith is shown a portable cot bed which has features that have won for it a large degree of favor among users of this class of equipment. It combines the qualities of convenience, strength, compactness and utility, and it can be used with equal efficiency by campers or in the home, when economy in space is desired.



COT BED OPEN.



COT BED FOLDED IN BAG.

The bed is in two parts, top and bottom. The top consists of either white or brown duck of strong quality and has two sets of dowels or side rails forming support for the canvas. The top when not in use is folded in bookfold style. This top is easily attached to the bottom by a series of hooks, and is readily taken apart again. The entire cot is of such simple construction that it can be set up for use, or closed after use, in a very short time.

The bottom part is a most practical support for the top, and consists of four pairs of legs connected by a steel gate, which allows these legs to close in telescope or gate fashion. When use is to be made of the cot, the bottom opens readily. The complete cot when folded and placed in the carrying bag makes a parcel about 4x4x 32 inches. It weighs about 16 pounds, and will hold 500 pounds.

The manufacturers of this bed, the Telescope Cot Bed Company, of New York City, also make a folding or telescope table which is much used. It is light in weight, and is convenient, compact and durable. The legs of the table close in the same style as the above described cot bed, and the table top is attached to these legs by a series of self-locking hooks. The size of the table when set up ready for use is 25x36 inches, 29 inches high, and when folded it measures 36 inches by 4½ inches by 7 inches; its weight is about fifteen pounds.

GLUES FOR SPECIAL PURPOSES.

One of the most extensive ways in which glue is utilized, and also one of the most important, is in the binding of books and work of a similar nature. Notwithstanding this fact, not many manufacturers have successfully solved the problem of making a product that will not crack or harden, which is one of the most serious objections that bookbinders have to the average hard glues. A Rochester, N. Y., firm, which has been engaged in the manufacture of various glues for many years, has, after careful and exhaustive experiments, produced a bookbinders' flexible glue which is said to be unsurpassed for all blank book, edition and bible work. It never hardens, but always remains flexible, and is elastic and tough as rubber.

This glue can be used for mounting on cardboard to prevent warping, and it has also proven superior for gluing covers on catalogues. It will readily mix with ordinary hard glue, when more strength is desired than flexibility.

Another important grade of glue made by this firm, Hart & Zugelder, Rochester, N. Y., is known as their H. & Z. metal glue. This is a special grade and is used for the purpose of gluing leather or cloth to all kinds of metal. It is said to hold so fast when once applied that the leather or cloth cannot be removed from the metal without cutting it off with a knife. The preparation of the glue for use is very simple; all that is necessary is to cut it up in small pieces and melt it in an ordinary glue pot, and apply the glue to the metal while hot.

SOME FACTS ABOUT CARBORUNDUM.

Of the various abrasive substances now in use there perhaps is none that more satisfactorily meets the numerous and exacting demands made upon it than carborundum. This product, which in the last fifteen years has shown such wonderful development, is now recognized in the grinding world as one of the most important inventions of the age. It is said to be harder and sharper than any other known abrasive, and these essential qualities, combined with its other advantageous properties, have caused it to become one of the most widely used grinding materials now being manufactured.

Carborundum, which was discovered and invented—and the two words are not synonymous—in 1891, is a chemical combination or union of the elements carbon and silicon, and is crystalline in formation. This union of the two elements, which has never been found in nature, is effected in the intense heat of the electric furnace. Carbonundum is, chemically, carbide of silicon, the symbol being SiC.

The first carborundum produced was made in a little crucible, and the current employed was that of an ordinary lighting circuit. The first output was hardly enough to cover the point of a penknife blade, but there was enough of it to disclose its properties and give a hint of its future uses. It was found to be very much harder than any other substance known, with the one possible exception of the diamond. It would cut and polish a diamond, and this fact suggested an immediate use for it as a substitute for diamond powder for polishing gems.

As the result of much patience a small vial was filled with finely powdered carborundum, and from the result obtained from this an order was received from a New York lapidary for several carats of the powder, at the rate of 40 cents a carat. Based on this original little order, the Carborundum Company, of Niagara Falls, N. Y., was organized and financed. When it was in regular operation its furnace plant consisted of four fire bricks. The output was four ounces per day. The carborundum crystals were crushed by hand with mortar and pestle. The powders were graded by floating in water in tea cups, and the sifting plant with which the grains were graded was a piece of wire netting tied over one end of an electric lamp socket.

From gem polishing the next step was valve grinding, and then the manufacture of little wheels, discs and points for dental use. Increased demands and increased production stimulated each other until, in 1894, the company was using 135 electrical horse power and producing at the rate of 45 tons of carborundum per year. In the fall of 1905 the company began to produce carborundum at its new plant at Niagara Falls. It used 1,000 electrical horse power and had two kilns, each 16 feet in diameter, for vitrifying carborundum wheels. In the eleven years that have elapsed since that time carborundum has steadily and rapidly advanced in public favor, until today it is universally recognized as one of the most important abrasive materials ever produced. It has a practical monopoly of granite and marble polishing and cutting, of pearl grinding, of the dental trade and of buffing leather. Carborundum wheels, of all shapes and sizes, adapted to every variety of grinding requirements, are used in enormous quantities. Carborundum paper and cloth are sold to the shoe and to the metal and woodworking trades.

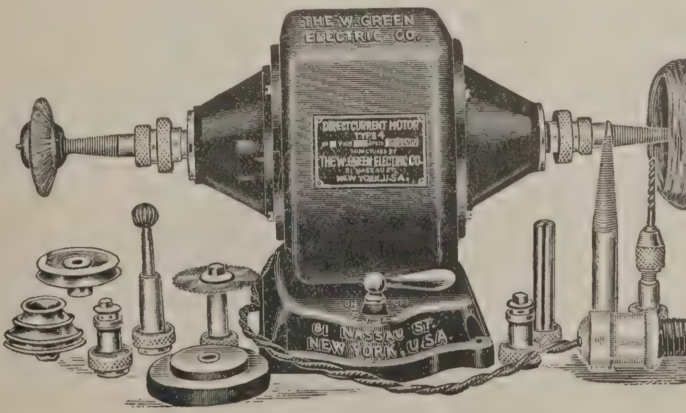
Aside from the grinding or abrasive industries, to which carborundum principally caters, the substance is supplied for a bewildering number of uses. It is made the groundwork of ornamental signs, is inlaid into brake shoes, is used for stair treads, for hulling rice, for linings to furnaces and for an almost endless number of other purposes.

The Carborundum Company's plant now covers eight acres of ground. It is using 5,000 electrical horse power, producing 5,000 tons of carborundum per year, and arrangements are at present being made to double the present furnace plant. Instead of two kilns, eleven are now in use, and two more are in course of erection. For the double purpose of giving quicker deliveries to European trade, and relieving the Niagara Falls plant, a factory having three 16-foot kilns is just being completed in Germany.

NEW POLISHING AND GRINDING MOTOR LATHE.

Jewelers, silversmiths, opticians, dentists, etc., will be interested in the direct-current motor lathe illustrated herewith. Its makers are large manufacturers of all kinds of polishing, drilling, grinding and lapping lathes, plating dynamos and other electrical specialties, and their extensive experience as leaders in this line of apparatus has enabled them to embody in the construction of their various machines the most up-to-date improvements and all the important features essential to the production of equipment of the highest known efficiency.

The lathe shown here is a new model, and it is said to be one of the most perfect devices of the kind now being manufactured. It is symmetrical and graceful in design, and ample room is allowed for working on both sides of the wheels or buffs. The ball bearings, which are especially made for this machine, are of the finest tool steel, and will last a lifetime. The machine is dust and moisture proof, and no oiling or lubrication is necessary;


THE W. GREEN ELECTRIC CO.
DIRECT CURRENT MOTOR
THE W. GREEN ELECTRIC CO.
NEW YORK, U.S.A.
61 NASSAU ST. NEW YORK, U.S.A.

DIRECT CURRENT MOTOR LATHE.

hence there is no leakage or dripping oil or accumulation of dust, which is a common and disagreeable feature in the ordinary designs when oil or vaseline is used. The front of the lathe is easily removable, permitting inspection of the brushes and commutator while the motor is running.

A pleasing feature of these motors is the wide range of speed with direct and positive control. Each machine is provided with a regulating switch mounted on the base of the motor, which is fitted with indicating stops so that the speed may be instantly set at the desired point, and will remain intact until again shifted. The manufacturers, the W. Green Electric Company, of New York City, make these machines in a variety of sizes, suitable for the smallest repair shop or the largest manufacturer. They have four variable speeds, ranging from 600 to 3,500 r. p. m.

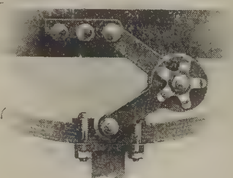
A glance at the cut will show the careful construction of the solid base and adjustable tool rest. Each motor is so arranged that the tool or work rest can be readily attached to either side of the machine. The extra large shaft, armature, commutator and winding all contribute to long life and freedom from breaking down even under conditions of heavy overloads. Another valuable improvement is the interlocking chuck. This can be used for either right or left hand rotation. Neither taper nor screw fits are used, and both jam nuts and throw-off levers have been discarded. The chuck fits accurately on the long seat, and the act of putting it on the motor shaft automatically and instantly locks it securely in position for either direction of rotation.

The motor can be attached to any ordinary electric light, and needs no adjustment, as it is always ready for use. These motors are adapted for use in both large and small wholesale and retail jewelry, silverware, dental and electrical houses, manufacturing plants, hospitals, hotels, private dwellings, restaurants, etc., in fact wherever polishing, buffing, drilling, grinding and power are needed.

IMPROVED SHOCK ABSORBER FOR AUTOMOBILES.

After making a number of exhaustive experiments, the Hartford Suspension Company, of New York, has perfected and placed upon the market its 1907 shock absorber. In points of superiority and efficiency it is said to surpass anything heretofore turned out by this pioneer concern, whose previous models of absorbers have become so well known throughout the world, having been made a part of the equipment of a large number of the leading automobile manufacturers.

The new style is designated "Type S," and while it carries out the same principle as the company's 1906 model, it is so constructed that it is automatically lubricated, and when adjusted to the car is applied in such a way that the movement is in a straight line between the frame and axle, there being no opportunity for shearing, and the self-locking device makes an adjustment unnecessary in the ordinary life of any car. The manufacturers guarantee the new model for 10,000 miles without an adjustment, and state that exhaustive tests made on a heavy foreign touring car demonstrated that in a 5,000 mile journey the shock absorbers, when taken off and measured by a micrometer, showed a shrinkage of less than .001 of an inch, and the actual pounds pressure was reduced to such a slight fraction of the ordinary amount as to be practically imperceptible.


NEW SHOCK ABSORBER.

Many of the shock absorbers of the present time operate in baths of grease, which does away with the object for which they are intended. The one illustrated herewith overcomes this difficulty by being automatically lubricated as the circumstances require, for a too freely lubricated frictional surface would mean the entire absence of friction of rest, which, in connection with the friction of motion, is the most important feature in retarding the action of the springs. After extensive experiments it was found that by using surfaces, both of which were of non-absorbent material, it was a difficult problem to keep the lubricants on these parts. The great amount of pressure required to keep the springs in check by the means intended does not enable the lubricant to get over the surfaces, and only such parts of the surfaces would receive lubrication as might happen to be uneven. In this new absorber this objection has been overcome, for, instead of using two non-absorbent surfaces, the manufacturers have used one absorbent and the other not. The absorbent materials are treated by a chemical process to retain the lubricant which indefinitely lubricates the surface, and this lubricant is only extracted when the heat caused by the frictional parts reaches a point before abrasion, when lubrication becomes necessary. Extensive experiments were made before a substance was finally discovered that would be absorbent, but still unyielding to the great pressure under which it must always act, and one not affected by atmospheric changes.

The same principle of the 1906 model is carried out in the three-point frictional device, two arms being paired and joined at the outer end by a single stud, while at the frictional bearing, which is the vital point of the shock absorber, they are separated sufficiently to permit of the interposition of the third member. A pair of frictional washers are placed between the two outer sections and the inner one, thus securing a maximum of frictional surface. The arms are made of the best quality of crucible steel, and a special design split lock nut, which claps and offsets the five-pointed spider washer of tempered steel binding the moving parts together and maintaining a constant tension upon them, is also incorporated with a few changes in the 1907 model. This spider washer keeps the degree of tension equal at all times, and any amount of wear is in this way automatically disposed of, and the resistance of the device made constant at all times.

All arms are equal, making the suspension uniform and interchangeable, and no left or right are made. A radical change has been made in the end of the 1907 model. The former tail pieces of conical form have been abandoned. In place of these the same general construction of the center friction has been followed, substituting for the latter in the old model the same absorbent materials as are used in the center disc. The ends are absolutely dust and water proof, and the friction surface has been increased tenfold. The end riveting studs have been increased from one-half to nine-sixteenths of an inch. The new ends have been subjected to most severe tests, and it has been found impossible to break them. Owing to the simple construction and uniformity of the 1907 model, it is more easily applied than any model of previous years. The increasing of the friction makes it far more efficient, there being a larger number of frictional parts than heretofore, and the tension is set much higher.

The suspensions of this company have been adopted by such well known automobile manufacturers as Studebaker, Matheson, Locomobile, Pierce Great Arrow, Stevens-Duryea, Napier, Aerocar, Frontenac, Lane, Watson-Conover, Marmon, Peugeot, Gobron-Brillie, Rossel, Brasier and Sultan.

Mr. Louis Wagner, who won the Vanderbilt cup race, subsequently made the statement that without the Hartford device on his car neither he nor his mechanic could have remained in their seats over the rough course at the furious pace they traveled.

It is worthy of comment that until recently there has been no change in the Truffault-Hartford shock absorber used in France since it was first put on the market, while the American company has improved its model until its present high efficiency has been attained. The American company has practically closed negotiations permitting the French company to adopt the former's improvements on a royalty basis, which is an acknowledged tribute to American enterprise.

TIME SAVING DEVICES FOR OFFICE AND STORE.

The strong demand which modern business methods have created for time and labor saving appliances and machines has caused manufacturers of this class of equipment to exercise their utmost ingenunity to produce devices adapted to the attainment of such results. The number of such inventions is legion, and many of them are wonderfully efficient in performing the work for which they were designed.

The utility and convenience of the office devices described below will be readily appreciated by every business man. Sign and price markers are, of course, indispensable in every store and manufacturing plant of any size. The markers illustrated herewith are adapted to a wide range of work, and they are in use in all parts of the world. They are used for every purpose that the services of a professional sign writer would otherwise be required for. No experience is necessary for the successful operation of the markers, and they can be used on any material—wood, cardboard, etc. They are principally used for printing window show cards, shelf labels, notices of any kind, shipping instructions on cases, barrels and other packages, etc.

BUSINESS OUTFIT FOR MAKING RUBBER STAMPS.

These sign markers consist of rubber letters in various sizes, from one-half to 4½ inches in height. They are put up in complete sets containing letters, ornaments, extra words and accents in any language desired. The manufacturers, the Fulton Rubber Type, Ink & Pad Manufacturing Company, of Elizabeth, N. J., manufacture about one hundred styles of these markers, and make them to suit the language and money requirements of any country for which they may be intended. Each set is designed for a different form of work, in accordance with the size and style of the letters, figures and characters it includes. Signs which contain few words permit the use of letters proportionately larger than signs which contain many words. Some business men prefer to show nothing but prices, and for this class special figure sets are made.

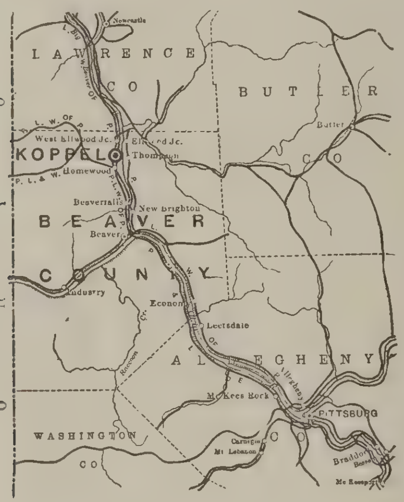
The business outfit shown here combines a complete set for making rubber stamps, in a variety of forms, for immediate use, and these sets have been very generally adopted in business houses throughout this and foreign countries. With one of these outfits anyone can make a rubber stamp quickly and change the wording as often as desired. They line perfectly and make very neat impressions. The outfits are put up with single or more alphabets, and figures and accents suitable for the different countries.

SIGN AND PRICE MARKERS.

A NEW INDUSTRIAL CITY.

There is now nearing completion in the State of Pennsylvania a new town, which in a few years will no doubt be heard of in all parts of the manufacturing world, as its chief projectors are men who have already attained world-wide renown as manufacturers of railway materials. The new town is destined to be one of great industrial importance, since the intent and desire of the entire population will be to produce portable and industrial railway equipment of the most improved designs and highest efficiency. The organization at the head of this gigantic undertaking is the well-known Arthur Koppel Company, of New York, whose thirty years of continuous service in the production of railway equipment has brought its products into use in every part of the civilized world.

The new city will be named Koppel, and its location is an admirable one, being but 35 miles from Pittsburg, Pa., and having excellent shipping facilities by rail and water. In the heart of the great iron and steel belt, this new industrial town will harbor one of the largest and most complete plants for supplying one of the greatest accessories of modern industry.



It is universally admitted that one of the chief factors in the marvelous developments of today is the great strides made in the perfection of handling facilities; the employment of mechanical means of doing in a short time that which would otherwise require a large force of manual labor. In this connection the narrow gauge or commonly termed industrial railroads spread over vast areas could scarcely be operated without their industrial railway systems, connecting the various departments, carrying materials in process of manufacture from one stage of production to the other, and carrying ore and coal from the bowels of the earth to its surface. The railways, dump cars and various other equipment of the Koppel Company are now so extensively used throughout the industrial world as to scarcely need any description. The company's line includes narrow and standard gauge railway materials, portable and permanent track, rails with all accessories, switches, frogs, turntables, and steel and wooden cars of every description and for all purposes. Over a quarter of a century of continuous experience in the development of this class of equipment has enabled the company to manufacture products capable of meeting every possible demand.

The scope of the new project may be realized when consideration is taken of the fact that it not only is the intention to erect a great manufacturing plant, but also to build an entire town. Homes will be provided for the employees, and all the essentials for a model industrial community will be provided.

So that a portion of it may be immediately available, the new plant will be constructed in sections, the first of which is now nearing completion and will be ready for operation before the close of the present winter.

In our December issue, in commenting on the profusely illustrated new catalogue which the H. Mueller Manufacturing Company, of Decatur, Illinois, is about to issue, we erroneously gave the company's address as Chicago, Ill. This concern has for many years been located in Decatur, Illinois, where it has established one of the largest plants in the world devoted to the manufacture of water, gas and plumbing goods.

The new catalogue which is now in course of compilation will undoubtedly be one of the most complete works of the kind ever issued, and the nature and arrangement of its contents are such as to make it a reference book of much value to all gasfitters and plumbers.

The substitution of grease for oil as a lubricant on engines, shafting, pumps, and, in fact, any machine that needs lubrication, is constantly becoming more general. Engineers and machinists who have adopted its use claim that not only is the reduction for lubrication considerable, but the results obtained are invariably better. One of the most extensively used lubricating greases now manufactured is that put up by the Keystone Lubricating Company, of Philadelphia, Pa. Engineers who have had trouble with hot bearings have entirely overcome this difficulty by the use of the Keystone product. The chief engineer of one of the largest railroad companies recently stated: "I have had various chances to use many kinds of oils and greases during my eighteen years as assistant and finally chief engineer on river steamers, as well as on stationary machinery, but have never found a lubricant to compare with the Keystone brand. One cup of this grease will go further and lubricate better than four to five cups of any other kind I have ever used." This company also makes a fluid grease, known as No. 6 density, which is said to be valuable for any purpose where a liquid oil is required, especially for cutting threads on bolts and gas pipes.

The United States exported nearly $500,000 worth of ink last year.

EXPORT NOTES.

For any additional information, names of importers, etc., write AMERICAN EXPORTER.

OPPORTUNITIES IN FORMOSA.

Considering the fact that the United States takes more than one-half of the Formosan exports not taken by Japan, it is only right for the American merchant to consider himself entitled to a good share of the island's import trade. At present imports from the United States into Formosa are about one-sixth of the amount of the exports to the United States.

American manufacturers of sugar machinery should bear in mind that the sugar industry in Formosa is growing rapidly, and that within the next few years many large mills will be constructed. With the growth of this industry there will also be a demand for tramway materials.

A recent concession made by the Government to a Japanese syndicate for the exploitation of the forests in the Mount Asi district will create a demand for sawmilling machinery, logging equipments and railway supplies. The timber stands in mountainous regions, which will be made accessible by the construction of a railway about 40 miles in length. In addition to the bridges and other railway material required for the completion of the main line of the Formosan Government railway, there will also be a demand for such materials for the projected line from Taihoku to Gilan and Sano on the east coast, a distance of 50 miles. The works department of the Government has under consideration the construction of waterworks at Taihoku and the installation of an electrical plant for lighting and supplying power to manufacturers. A 600 horse power plant is now in operation, but is inadequate. It is quite probable that there will be a good demand for electrical machinery and equipments.

JAPANESE ORDERS.

Large contracts are being placed in the United States for the equipment of huge steel works which the Japanese Government is to operate under the name of the Imperial Steel Works on the island of Magi. The contracts are being handled through the New York offices of the three Japanese contracting firms of Mitsui & Co., Takata & Co. and Okura & Co., who are acting for American manufacturers.

The Japanese plant will entail a cost of about $10,000,000. The orders for equipment so far call for two bar mills, tube mill, blooming mill, rolling tables, furnaces, cranes and a general line of steel-making equipment.

In addition to furnishing the equipment for the Imperial Steel Works, Americans will also ship a general line of machinery for a big lead mill and a complete outfit for a tin plate mill which private Japanese interests are to construct in the vicinity of Kobe.

AGRICULTURAL IMPLEMENTS FOR SIBERIA.

At a recent conference held at the Ministry of Commerce, St. Petersburg, it was decided that agricultural machinery required by peasant emigrants to Siberia and other portions of the Russian Empire would have to be ordered abroad this year, as the Russian factories would be unable to deliver in time. Next year an attempt will be made to introduce Russian machinery among the settlers.

PUBLIC WORKS IN CUBA.

The expenditure of $6,000,000 for public works now under course of construction or of urgent necessity in Cuba has been recommended by Lientenant Colonel Black in a report which has been approved by the Governor of the island. This sum is a portion of the $12,000,000 provided for such purpose by the Cuban budget. The remainder of this amount, $6,000,000, will not be expended before the completion of a further study of conditions, upon which a supplementary report is to be made. The projects authorized consist mainly of the extension of important highways, the completion of public buildings and improvements in hospitals.

WINDMILLS FOR ARGENTINA.

There is a steady demand in Argentina for American made wind motors. In consequence of the general scarcity of waterways in parts of the republic there is a constant demand there for pumps and windmills. There are some firms in Buenos Ayres who do nothing else but fit up these plants. Lately some French makers have tried to get into the trade of supplying wind motors, but their products are found to be too heavy and too expensive. At present American makers have the control of the market.

WIRE FENCING WANTED.

The farmers of Sucre (Bolivia) are feeling the necessity of fencing in their ranches, which are extensive, in order to reduce to a minimum the straying and stealing of immature or unmarked cattle. What they require is something cheap but durable, which will fairly resist organized attempts at destruction and be equally useful over level country and broken ground which the boundaries traverse. It is possible that posts will not be wanted in view of the fact that there is in the country an abundance of ironwood and other timbers which will resist almost anything, as well as galvanized cast iron; but, of course, tenders might include posts, which, in some cases at least, will no doubt be wanted.

SOUTH AFRICAN DUTY ON CATALOGUES.

The trouble caused by the catalogue tax in South Africa has been ameliorated to some extent by Lord Selborne's announcement that the catalogues of oversea firms are to be relieved of the impost, though the *South African Export Gazette* says that the duty is still apparently enforced on packages weighing over 8 ounces, affecting expensively produced and often heavy catalogues of engineering firms and bulky sample books of soft goods houses. There is one way, a clumsy one, out of the difficulty. Catalogues may be dispatched in bulk to a clearing house in South Africa, duty paid on them there, then stamps affixed and posted; but few manufacturers are in a position to go to all that trouble and expense, as it requires the assistance of agents in Africa. It is said that the South African governments are anxious to get rid of this obnoxious tax, though they will do so only by degrees.

In connection herewith it may be mentioned that catalogues weighing less than 8 ounces are admitted duty free, while the duty on those above that weight is 4 cents per pound, and in addition thereto a fee for clearance of 12 cents for each package.

RAILROAD PLANT FOR ITALY.

The Italian Government is proposing to spend $20,000,000 in improving the rolling stock, etc., of the state lines, which will be improved, the railway stations repaired and enlarged, and new tools, rolling stock and general railroad plant added. The tenders will probably be open to foreigners, and provided they can quote 10 to 75 per cent. below Italian prices the business will be placed with such foreign bidders.

SIAM A MARKET FOR BICYCLES.

A report from Bangkok, the capital of Siam, is to the effect that the imports of cycles and motors sprang from $4,970 in 1904 to $107,680 last year. Siam is also importing automobiles in increasing quantities.

IMPORTATION OF STAVES IN ALGERIA.

Immense quantities of staves and wood for staves are imported into Algeria every year. During the first ten months of 1906 the value of these imports was approximately $122,000, of which the United States furnished nearly one-half, the rest coming principally from Italy and Austria.

PANAMA CANAL CONTRACT.

The Isthmian Canal Commission, Washington, announces that the date of opening the bids for completing the Panama Canal has been postponed to January 12, 1907. The amount of bond required is reduced from $3,000,000 to $2,000,000. Bidders must still have a capital of $5,000,000, but the bond is part of the capital.

MOTOR CARS IN SOUTH AFRICA.

During the first nine months of this year the United Kingdom shipped $220,000 worth of motor cars to South Africa, a considerable advance over any previous year. For use on the Rand a car on general touring or runabout lines is suitable, but for use on roads which intersect the veld, and frequently on the veld itself, special features of construction, such as extra strong springs and well-raised bodies, to admit the "negotiation" of spruits and water courses, are essential. For use in any part of South Africa aluminum bodies are very popular, as wood, unless exceptionally well seasoned, warps badly under the sub-tropical sun. The talk of providing motor roads in South Africa is said to find extensive favor, for it is estimated that they can be constructed at a cost of $2,500 per mile, as against $20,000 per mile of railway, and that motor coaches would carry passengers and mail more expeditiously and with greater economy than a railway. There is every reason to believe that American built automobiles could be introduced on a far larger scale if proper efforts were made.

RAILWAY CONSTRUCTION IN ARGENTINA.

The *Review of the River Plate* announces that the Argentine Government has resolved to carry out the construction of the following lines already sanctioned by Congress: Cordoba to Rio IV, with branches to Huinca Renancó and Los Reartes, at a cost of $10,400,000 gold, and two branches in the Province of Tucuman, one from Las Cejas to Antillas, a distance of 25 miles, at a cost of $1,858,819 gold, and another from Riacho to Santa Rosa of 12 miles, at a cost of $325,694 gold. Tenders are to be called for.

DEVELOPMENT OF LOURENCO MARQUEZ HARBOR.

A proposal to the Portuguese Government to hand over the work of completing the comprehensive harbor scheme at Lourenço Marquez, South Africa, to an Anglo-American syndicate with a capital of $10,000,000, if carried through would, according to the *British South African Gazette,* accelerate the construction and equipment of the wharves, piers and docks which have been undertaken. Last year's import and transit trade (to the Transvaal) amounted to $26,765,000.

AMERICAN LEATHER IN GREAT BRITAIN.

The imports of American leather into the United Kingdom are still on the increase, amounting, during the first eight months of 1906, to $12,593,600 in a total import of $31,992,200. This is an increase in the imports of American leather of $2,936,300, as compared with the first eight months of 1905. The countries from which the imports of leather manufactures were imported during the three periods are not given in the official returns from which the leather statistics were taken.

AMERICAN EXPORTER

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During the twelve months ending with February, 1907, 211,000 copies of the AMERICAN EXPORTER were printed and circulated, an average of 17,583 per month.

THE FOREIGN TRADE CONVENTION AT WASHINGTON.

In this issue we publish a report of the proceedings of the foreign trade convention, which opened at Washington on January 14 and closed on January 16 with a banquet, at which the President of the United States was the guest of honor.

While primarily the convention was purely American in object, yet to all the great manufacturing and consuming nations of the world the direct results of this meeting of manufacturers, business men and public officials promise to be of the utmost importance.

In view of the steps taken during the past few years by certain European countries, and also by Australia and Japan, in establishing a maximum and minimum tariff of import duties, Secretary Root's official utterance is timely and significant, to the effect that the Administration recognizes the need of a revision of the tariff laws of the United States, and approves of the maximum and minimum system of levying duties.

What Mr. Root said demonstrates that our Government earnestly desires to avoid any attitude that might provoke a tariff war, and that it also wishes to secure for United States manufacturers in their dealings with foreign countries the advantages of "the most favored nation" treatment. Mr. Root's masterly speech will do much to bring about even a better understanding between this and other nations.

The remarks of President Roosevelt before the delegates assembled at the banquet on January 16 are also of the most vital interest in connection with the resolutions passed by the convention. By his endorsement of Secretary Root's appeal for closer relations with South and Central America the President makes clear the depth of his hope that no efforts will be neglected by Congress to assist capital in bringing about regular and effective communication with our sister republics in Latin-America.

The subject of a merchant marine received the most careful and thorough discussion at the convention, and it is to be hoped that the national interest aroused in this cause will bear immediate and liberal fruit.

It is to be regretted that more attention was not paid to the question of patents and trademarks, but it is realized that much was accomplished in the three days, and that, on such an occasion and under such circumstances, some matters must receive less attention than others.

The subject of the establishment in foreign countries, particularly in South and Central America, of American banks was given due attention by the convention. We have long advocated this, for it is unquestionable that direct banking facilities with our foreign customers will be a great stimulus to our foreign commerce. We trust that the interest displayed in this subject by the delegates to the convention, and by merchants and manufacturers in general throughout the United States, will have the desired effect of impressing this need upon our leading financial institutions, thus conferring a benefit not alone upon our own exporters, but upon all the dealers with whom we are doing, and hope to do, business.

THE TARIFF CONFERENCE AT BERLIN.

The negotiations between the commissioners appointed by President Roosevelt and the representatives of the German Foreign Office, instituted for the purpose of reaching an understanding that will avert the threatened tariff war between the two countries, have been concluded. While the details of the conclusions which will form the basis of future negotiations are not known, and will probably not be made public before this number of the AMERICAN EXPORTER goes to press, it is generally understood that serious complications with Germany will be averted.

The existing agreement between the United States and Germany will expire in June. No definite or permanent steps can be taken by this Government until next December, when the new Congress convenes. It is therefore probable that a temporary arrangement has been agreed upon between the German and American commissioners which will operate until such time as Congress can be persuaded to take decisive steps. The so-called temporary arrangement will doubtless consist of certain concessions which the President is in position to grant.

It is earnestly to be hoped that the action of Congress will not be seriously delayed. With two great manufacturing countries so powerful as Germany and the United States at loggerheads, the result could not fail to be far reaching and extremely disastrous. For more than ten years the tariff has been a "bone of contention" between the two countries. It will seem incredible if mutual concessions cannot be made that will promote better relations on both sides of the Atlantic.

OPPORTUNITIES IN MANCHURIA.

The Manchus are good farmers and there should be a first-class field here for farming implements of all kinds. Flour is a staple among the Manchurians. They use it in the making of bread and macaroni. The fertile fields of the Sungari Valley will likely be planted in wheat this fall. This will, if successful, put a large suppy of grain on the market and create a demand for milling machinery.

Cotton piece goods is another staple. Japan is after this market in earnest. She has increased nearly all her mills in Japan and is sending to Manchuria quantities of piece goods, already dyed and ready to make up. This it seems is what the Chinese want. The favorite colors are light and dark blue, and the Japanese, knowing the wants of the Chinese, are taking advantage of this knowledge to supply them direct.

Building material of all descriptions is in demand. There is ample time for the business men of the United States to capture a portion of this field. Spring opens early in March, and unless all signs fail there will be a great deal of building done in Dalny and Port Arthur.

The wealthy Chinese merchants predict for Dalny a great future. They say it will be the distributing point for all of Manchuria, provided, of course (and they lay great stress upon this fact), that the South Manchurian Railroad shall prove a success and lower its freight rates in competition with the junk transports on the Liao River at Niuchwang.

There is considerable talk of the establishment of a Chinese custom house at Dalny during the coming winter. Of course this will be for goods intended for the Manchurian trade outside the leased territory.

A NEGLECTED MARKET.

In our May, 1906, issue we published a letter from our New Zealand correspondent calling attention to the International Exposition to be held in that country, and the opportunities which existed for American manufacturers to make further inroads into the markets of Australia. The management of the exposition sent some seven thousand copies of the official circulars to business houses throughout the United States, accompanied by invitations to make exhibits. The American consular agent at Christchurch seems to be of the opinion that an excellent opportunity to increase American trade was overlooked. In a recent report to the Department of Commerce and Labor he says:

> "This exposition is the most important one ever held in Australasia. It covers 14 acres and the cost of the main buildings is estimated at $500,000, although the entire expenditures before the opening were probably three times that sum. All nations were invited to exhibit, and it is much to be regretted that American manufacturers did not respond to the 7,000 copies of the official notice which were sent to representative firms in the United States. The Standard Oil Company, through its New Zealand representative, is the only American concern with an exhibit.
>
> "This is all the more to be regretted when it is remembered that of the $64,144,285 total imports into New Zealand last year, three-fourths of which are manufactured goods, $7,436,000 worth came from the United States, thus showing the importance of this colony as a consumer of American goods. As a contrast, the handsome Canadian Building, 272x152 feet, is a feature of the exposition. Canada, whose contribution to the imports into this colony last year amounted to only $550,000, apparently recognizes the importance of cultivating the New Zealand trade for the disposal of manufactured goods."

New Zealand is a country little understood by many American manufacturers, who look for markets much nearer home, and who hardly conceive of an antipodean people who are much like Americans in customs and wants, and whose commercial necessities can be filled by the same class of goods required by Americans. A potent argument of the American manufacturer when confronted with statistics which show that England, Germany and India supply nearly all of the wants of such markets as the Philippines, especially in the line of cotton fabrics, is that these markets require a class of goods which have to be manufactured especially for them, that in many cases special machinery would have to be designed or obtained for their manufacture, and that this, for various reasons, is impracticable or undesirable. This argument does not hold good in New Zealand.

The labor laws of New Zealand, with the short hours of labor and high wages, render it out of the question for the country to supply its own wants for manufactured goods in competition with other countries for many years to come, and with the general and increasing prosperity of the country through the great increase of late years in the value of the export of wool, meats, butter, cheese, grain, kauri gum, flax, gold, etc., American manufacturers should miss no opportunity to ascertain the wants of the people.

The objects of the exposition, which will last until April, are educational in the arts, sciences and manufactures of the country, and afford an excellent opportunity to study the requirements of New Zealand, a country in which, perhaps, the general standard of comfortable living is higher than in any other part of the world.

New Zealand is a remarkable country in many respects. Its food producing capacity, mineral resources, thermal wonders, fishing, climate and scenery and prosperity generally are not paralleled. Gold to the amount of $325,000,000 has been taken from the surface in the last fifty years, and yet even the surfaces of the gold bearing deposits have been only a little worked. Great results wait further prospecting and the use of scientific methods. New Zealand produces excellent coal, and in close proximity are immense deposits of iron ore waiting development.

PHILIPPINE IMPORTS DECREASING.

The value of Philippine products imported into the United States in the fiscal year 1905-6 was about $11,500,000—a decrease of $4,000,000, or 25 per cent. Yet there are Senators who have a nightmare whenever Philippine competition in tobacco and sugar is mentioned, and who shut their eyes to the injustice of the process by which we are steadily closing our markets against a dependency entitled to our encouragement and support.

ARTICLES FOR CHINA.

In a recent report on the import trade of China the British commercial attaché at Peking furnishes the following valuable information:

Soap will always command a ready market in China. I have traveled in many out-of-the-way places where it has never been heard of, much less seen, and where my cake of soap was looked upon with the greatest curiosity. On the other hand, I have seen the best French toilet soap displayed in a shop about 300 miles from the Tibetan border at the exorbitant price of about 75 cents a cake. Such soaps are treasured more than used. What is wanted in these remote places is a common scented colored soap at a reasonable price. There are, of course, substitutes for toilet and washing soaps in China, while the materials for its manufacture are abundant.

In the trade in cutlery, electro-plated ware and enameled ware, while the first two are for the well-to-do classes, the last named is within the reach of all. Where one used to see a chinaware basin or wooden tub among the odds and ends of a Chinese traveler's baggage on board ship or on land, the enameled is now prominent, and, being unbreakable, it has come to stay and to oust the more fragile article. There should be one in every household in China, and even far away Tibet is importing them across the Indian frontier. The same remarks apply to glass and glassware, lamps and hardware. There is an ever-increasing desire to possess such goods.

In these days foreign household stores, beer and porter, spirits and wines are by no means despised by the Chinese. Some of them are, indeed, too common, and even when not of the best brands have to be well paid for.

MILLIONS FOR MACHINERY.

The probability that, as a result of the new South African customs arrangement, a number of manufacturing industries will be inaugurated with at least reasonable prospects of permanency opens up some very interesting possibilities for makers and exporters of machinery, states the *British and South African Export Gazette.* During the last five years South Africa has expended $50,000,000 on new machinery; and the total value of the machinery in the country at the present time is estimated at no less than $150,000,000.

MINING MACHINERY FOR ZAMBEZIA.

A report from South Africa is to the effect that the new Governor-General of Lourenço Marquez has announced his intention of doing something to encourage the development of the mineral resources of that Portuguese East African colony, and, as the Zambezia district is rich in gold, copper, silver and coal, there will, in all probability, soon be quite a demand for mining materials and supplies. Already new gold crushers are being installed. American manufacturers and exporters ought to come in for a share of this prospective business in Zambezia, but, unfortunately, there are no official or commercial representatives in any part of that rich country.

OPPORTUNITIES IN SERVIA.

Farming is the chief industry of Servia, and reaping machines worked by horse power should find a good sale there. Servia imports about $250,000 worth of agricultural implements yearly. There is a chance to sell stoves, as all buildings are heated by stoves, with wood or coal for fuel. Austria has built up quite a trade in iron and porcelain stoves lined with fire brick. Iron stoves lined with tile or brick, having fuel-saving appliances and artistic in shape, would find a ready sale.

Belgrade and many other of the smaller towns are lighted by electricity. As in most other things, the chief source of supply is Austria-Hungary. That the United States can compete successfully in this market is shown by the following example: A few weeks ago the American consul took a trip into the interior of Servia to the city of Valjevo, situated 100 miles from the nearest railroad. There he discovered an electric plant fitted out with American machinery. The owner of the plant told the consul that American electrical goods gave entire satisfaction and were much better than German or Austrian apparatus.

There should be during this year a good market for all sorts of mining machinery, as many new mines are about to be opened up. Several Englishmen are now in Belgrade looking after mining concessions. Mr. J. R. Finney, of Valjevo, Servia, expects to start work soon on a copper mine and will need some machinery.

INDIAN MARKET FOR AMERICAN GOODS.

A careful canvass discloses the fact that the following articles of American manufacture are to be found in the Indian market: Boots and shoes, arms and ammunition, books and stationery, building materials, buggies, cars and wagons; clocks and watches, porcelain ware, glass and glassware, instruments and apparatus, leather and manufactured leather, painters' materials, soap, requisites for games, umbrella fittings, typewriters and supplies, motor cars, refrigerators, oils, patent medicines, drugs and druggist supplies, canned fruits, canned soups, canned meats, dyes, chemicals, cigars and tobacco.

TRADE OF ANGOLA.

In the great Portuguese possession of Angola, West Africa, having a territory of 500,000 square miles and a coast line of 989 miles, the United States has had no consular representative since 1892, although up to that time Loanda was an important American consulate. According to a recent report of the British Consul at Loanda, the imports in 1905 amounted in value to $6,800,000 and the exports of Angola to $4,460,000.

Aingola is well worked by German commercial travelers, who make Loanda their headquarters. A large barter trade is conducted with the natives, who collect rubber which they carry to the up-country stores, receiving in return therefor rum, cotton goods, blue bafta, guns, powder, cutlery, beads, earthenware utensils, soap, etc. The rubber finally reaches Loanda, Benguela, etc., whence it is shipped to Europe. Two British steamers call monthly at Loanda, and the Germans are served by the Woermann line.

It is to be regretted that the trade of Angola is almost entirely controlled by Portuguese, British and German firms, and it seems that American manufacturers have never paid any attention to this market.

UNITED STATES LOSING GROUND IN JAMAICA.

The United States made increased purchases of Jamaica's $8,731,854 exports for the latter's fiscal year 1906, buying 57.4 per cent., or 4 per cent. more than in the previous year. On the other hand, the sales of American goods in Jamaica decreased from 42.8 per cent. of the whole amount of imports in the fiscal year 1905 to 39 per cent. of the total imports of $9,343,193 in 1906. Great Britain secured 48.9 per cent. of Jamaica's import trade in 1906, against 46.8 per cent. in 1905.

PROCEEDINGS
OF THE NATIONAL
CONVENTION FOR THE EXTENSION OF FOREIGN COMMERCE OF THE UNITED STATES.

More than 600 delegates from all sections of the country met at the New Willard Hotel in Washington on January 14 to attend the National Convention for the Extension of Foreign Commerce of the United States. They had the privilege of hearing addresses by the President, by Secretary of State Elihu Root, Secretary of Commerce and Labor Oscar S. Straus, Speaker Cannon and a number of manufacturers prominently engaged in export trades. The convention continued in session for three days, and ended with a banquet honored by the presence of the President, several members of his Cabinet and other notable Government officials interested in export matters.

The delegates returned to their respective homes feeling that the convention was a decided success in every way, and that much good to foreign trade will follow as a result of the deliberations and of the exchange of views, as well as by the impression made by such a gathering upon Congress and the country.

In addition to delegates appointed by thirty-eight Governors of States, 110 commercial organizations were also represented.

The publisher of the American Exporter was the representative at the convention of one local organization and two national bodies—total membership 4,550.

PRESIDENT ROOSEVELT.

SECRETARY ROOT.

Purposes of the Convention.

The opening address was made by Mr. E. S. A. de Lima, chairman of the committee which issued the call for the convention. Mr. de Lima outlined the objects of the meeting as follows:

"This body was called together by the New York Board of Trade and Transportation, for the purpose of considering and devising measures for the enlargement of our foreign trade, and to promote the demand abroad for the products of our farms, workshops and mines. In issuing that call we had in mind the thought which was so forcibly expressed by that great constructive statesman, President McKinley, who realized the vital importance to this country of broadening our markets, and spoke of it in his memorable last address to his fellow countrymen.

"The policy which President McKinley advocated is all the more imperative today because of our greatly increased commercial, industrial and agricultural productiveness.

Our Crude Foreign Trade Methods.

"Where attempts have been made to introduce American manufactures into foreign countries, the methods adopted have usually been crude to the last degree. Little attention has been paid to the needs of foreign peoples, to their tastes or to conditions prevailing among them. Letters are written in English and prices given in dollars and cents, as if these were the universal language and standard of values; scant notice is taken of customs regulations or of the means of transportation in the country to which goods are shipped. It not infrequently happens that not only is the wrong article sent, but the goods are carelessly prepared for shipment in packages of extraordinary and unnecessary size for countries where customs duties are levied on the gross weight of the packages, and where transportation to the interior must be made on the backs of animals.

"The European countries are our most important customers; that branch of our international commerce is probably best understood by the American merchant and receives from him the greatest amount of the attention which he devotes to foreign trade; yet our sales to Europe do not average over $3 per capita annually.

Europe's Scientific System.

"While the American merchant has been absorbed in the development of domestic industries and his energies have been directed chiefly to ministering to the demands of internal trade; while every section of this country has been enjoying an unparalleled prosperity, owing to and dependent almost wholly upon our own resources and consumption, the nations of Europe have been making foreign commerce a study little short of scientific and have been judiciously strengthening themselves in the interests of that trade. Their men are well trained and experienced in dealing with other people; their steamship service is fully adequate and effectively responsive at all points to the demands made upon it; their consular representatives are able and efficient and their banking facilities an invaluable auxiliary to their industrial and commercial interests concerned in securing a large share of the world's trade.

"England, France, Germany, Austria-Hungary, Belgium, Italy and Spain have realized that the commerce of a country cannot be studied in a short time, but that a more or less lengthy sojourn among the people thereof is indispensable to the establishment of profitable business relations with them. They send out their young men to the countries with which they will trade, there to dwell a sufficient time to learn the language, form friendships, and study the resources and wants of the people that they may satisfy them; and finally, they adjust their scheme of credit and collection to the conditions of the country.

Urgent Need of Organized Effort.

"Let us consider our trade with the countries to the south of us and with the Orient. We supply barely 13 per cent. of the estimated importations of the Latin-American countries, Europe furnishing the other 87 per cent., consisting almost entirely of manufactures, while of our 13 per cent. a large proportion is foodstuffs.

"This convention should inaugurate an organized and effective effort to awaken the business men of the United States to a realization of the vital importance to this country of carefully fostering our foreign trade, because of its great possibilties for an enlarged commercial activity and as a safeguard during the years of business depression at home. Every organization represented in this body should become a centre from which to disseminate information on this subject.

Reciprocal Trade Arrangements.

"One of the questions demanding our most careful thought is that of reciprocal trade arrangements.

"The appointment of a committee of well-trained, experienced business men to negotiate treaties, which, while amply protecting American industries, will grant us greater privileges in other countries, would undoubtedly prove to be largely beneficial to our people. With several of our other southern neighbors we had arrangements some years ago which enhanced our trade with them. The conditions for a renewal of reciprocal treaties are especially favorable today in view of the very cordial relations established by Secretary of State Root in his recent visit to South America.

United States Alone Inactive.

"With Great Britain in the lead, all the peoples of the Old World have been steadily fostering and increasing their commercial relations abroad and strengthening their defenses at home. The United States claiming, and justly so, to be one of the most enlightened, enterprising and liberal nations of the world, stands prominently forward as a single exception which has allowed its shipyards to decay and its flag to disappear from the seas. While these countries have acquired the carrying trade of the world and have diverted the commerce of the world to their own ports, to the manifest advantage of their farmers and merchants, we barely carry 10 3-10 per cent. of our imports and exports in our own ships. Almost 90 per cent. of our foreign trade is carried in foreign ships at an estimated cost of $200,000,000 paid annually to other countries, that they may do a work for which no people is better fitted than our own. The re-establishment of our former supremacy as a maritime people is one of the most important questions now demanding solution at the hands of American statesmanship. Let us, therefore, impress upon our representatives in Congress the necessity of giving that consideration to the subject which will restore our flag to its place upon the seas and our nation to that naval pre-eminence to which it is justly entitled.

An Improved Consular Service.

"The great importance to our foreign commerce of an able and efficient consular service cannot be overestimated, and no effort should be spared to insure its absolute divorce from the domain of politics and its elevation to that high plane to which it properly belongs, that it may comport with the dignity of our country and with its growing needs and greater opportunities.

American Banks Abroad.

"One other manifest advantage which some of the countries of Europe enjoy over us when dealing with other peoples is in their banks in foreign countries. Those banks not only facilitate transactions greatly, but are of invaluable assistance in making investments, obtaining information, determining credits and making collections. It is well known that such banks yield rich returns.

Now Is the Time.

"I have been asked repeatedly: Why has this convention been called at this time? How can foreign commerce receive proper attention when the manufacturers of the country find it difficult to meet the demand for their products; when the output of many factories and mills has been sold months, aye, even a year ahead; when the railroads are overwhelmed by the volume of freight requiring transportation? My reply is, foreign commerce will be the pressing question in the near future; it will be a question affecting the welfare of millions of Americans. The reaping comes long after the sowing, but we must sow if we would reap. Let us sow now, that the harvest may be ready when we shall need it."

NECESSITY FOR EXTENDING OUR MARKETS.

Mr. James W. Van Cleave, president of the National Association of Manufacturers, and temporary chairman of the convention, in an able address, said:

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HON. OSCAR S. STRAUS, SECRETARY OF THE DEPARTMENT OF COMMERCE AND LABOR.

"Industrially speaking, 'abroad' might have seemed to mean little to the average American of 1857, 1867 or 1877. But it means much to us of 1907. And it will mean still more to the Americans of 1917 and 1927. We are richer than we were in those earlier and more boastful days. In number as well as in volume our industries have expanded. But every step in this expansion makes an additional demand upon us to open new markets in other countries for our products.

NEW OUTLETS FOR SURPLUS OUTPUT.

"In the year which ended two weeks ago the country's foreign trade passed the $3,000,000,000 line, and our domestic commerce amounted to more than $25,000,000,000. But these big figures warn us to look outside of our own country for new outlets for surplus. To a larger and larger extent every year home production outruns home consumption. The necessity for extending our business relations with Abroad is the principal thing that brought us here.

GOVERNMENTAL CO-OPERATION.

"We need something more than a merchant marine to enable us to win new markets and to hold those which we now have. We must learn the world's needs and tastes in merchandise, and set to work intelligently to supply them. The Government here in Washington is doing something toward marking out paths by which, with such co-operation, we can extend our trade abroad. Secretary Root is improving the consular service, and is equipping our Government agents at the world's chief importing points to learn those people's needs, and to study how we can supply them.

"Panics have a habit of coming with considerable regularity. They were here in 1818, 1837, 1857, 1873 and 1893. All arrived unexpectedly. Under the twenty-year law of periodicity another panic would be due in 1913. Some of our prominent men are predicting that a panic will come earlier than that time.

OUR POOR SHOWING.

"Out of Africa's hundreds of millions of imports annually we furnished only $19,000,000 in 1906. We sold to South America only $75,000,000 of the $600,000,000 of goods which she bought, and we contributed but $105,000,000 of the $1,100,000,000 of commodities which Asia imported from the outside world. And the volume of the imports into all these continents is rapidly expanding.

"Here, my friends, some of it at our own doors, is the vast empire which lies open to us to conquer. Let us combine foresight and enterprise in the regulation of our business; let us push our trade abroad by men who have technical skill and who can talk the tongues of the countries, and we will outrun all our rivals in the race for new markets; we will make our prosperity at home permanent and balanced; and we will place our flag on all the world's seas."

INSURANCE AGAINST TRADE DEPRESSION.

Mr. William McCarroll, president of the New York Board of Trade and Transportation and permanent chairman of the convention, gave a clear analysis of the situation confronting the manufacturer. He pointed out that while times are now unprecedentedly good in this country there is no guaranty how long this condition of affairs will last. He drew attention to the wisdom, in view of the rapidly increasing disparity between production and home consumption, of extending our markets abroad, of using a part—a small proportion will be sufficient—of present profits as an insurance against the future.

"This probably will be the most important commercial gathering that has ever met in the history of our country," said Mr. McCarroll. "Its coming together has aroused the deepest interest all over our nation, not only in official circles but also in commercial circles throughout the United States, from the Atlantic to the Pacific Coast.

"I venture to express the opinion that the present is a most happily ripe time for just such a conference as this. Our country, in years of but the recent past, has established itself as a world power and is recognized as such. Yet it is not in the direction of aggression or aggrandizement. The genius of this country has been perceived to be for progress and for peace. Our policy has everywhere and all the time been and is for the 'open door' and an equal chance for all of the nations of the world in the race with us. And of this policy we do not fear the result.

"The President of the United States, a man of force, who knows its use and believes in it when necessary, has not achieved his highest distinction in that direction. I believe you will agree with me that he stands to-day admired and honored the world over, not so much as a man of force, but as a man of peace, and to him has just been awarded the Nobel Peace Prize.

"Our great Secretary of State, that far-seeing, wise statesman, has been most diligent and forward in cultivating on our behalf amity and cordiality between the nations of the world. He has most wisely smoothed over the rough places to which we have come at times, so that I may say that everywhere the door and the way are opened for us upon the basis of cordial relationship with the nations of the world.

"Then we may think for a moment of our position as a nation, as a manufacturing nation. Until now we might almost say—for it is only in the last recent years —we have been in a period of preparation. We had, not so many years ago, 'infant' industries. These infants have grown. This is not the place to discuss what is the reason for the marvelous growth of these industries from infants to giants, as they now are. One may say that it is our political policy. Another may say that it is our inventive genius. Another may say it is the wonderful enterprise of our manufacturers. All of these undoubtedly are true in greater or less degree, but the fact in which we rejoice is that, after this period of preparation and development of our manufactories, we stand to-day with giant industry supplying a stupendous demand at home and also ready to supply an added demand come from whatever quarter it may.

"I think that we who are here agree that just in this time of prosperity, just in the time when we are busy, when we are making money and when we are not worried about not making money, that is just the time for us to look abroad and to prepare, not only for a time of leanness that may come (and if history is to follow its universal course it will surely come sooner or later), not only for the purpose as providing against that, but because to stand still and be satisfied would be un-American in spirit and would not be in keeping with the enterprise and the necessary progress of American manufacturers.

"We ought to be encouraged by a contemplation of the advantages we have as a nation. One we might think of is our geographical location. Here we are with the great manufacturing and consuming countries of Europe upon one side, and the Orient, a land with its limitless market, upon the other, and we should distribute with both hands.

"In addition to this our fraternal relations with the nations of the world are peculiar. People have come to this land, many of them to become citizens, from almost all the foreign nations, as we call them, of the world, so that there are ties of blood relationship between our own people and almost every other upon the earth, and these give us an advantage that was never vouchsafed to any nation.

"It should be borne in mind that not only in our own country is the 'boom' on, but that throughout the entire world there is an expansion of industry that is tremendous; that every nation is getting the benefit of it, and all are vying with one another in reaching out after their share, and we must be diligent to establish and maintain our place or fall behind.

"It may stimulate us to remember that commerce is the one enduring bond between peoples and nations. It has bound our own country with its various States together as one; and it must surely bind all the nations of the world at length as one, for it at once involves and evolves personal interests and personal friendships. In the last analysis commerce is the expression of the measure of the progress of the human race."

In conclusion, Mr. McCarroll added that the large attendance showed how interested manufacturers are in foreign trade, and that the principal question before the convention was how foreign trade can best be secured.

Secretary Root's Stirring Address.

Hon. Elihu Root was the principal speaker on Tuesday. Practically going before the convention as the mouthpiece of the administration, Secretary Root declared unequivocally in favor of a maximum and minimum tariff for the United States, with particular reference to the South American countries. His advocacy of reciprocity was taken to mean that he favors heartily a liberal policy in the encouragement of our trade relations with the Latin-American republics.

"The day of the single tariff," he declared, "has passed, and the United States, in order to obtain commercial advantages from other countries, must grant similar privileges. That can only be done through the maximum and minimum tariff plan."

Reciprocity Treaties.

"The question has often been asked of me," he continued, branching off into a discussion of reciprocity, "should not a system of reciprocity treaties be adopted for the purpose of promoting our relations with South American countries. This is a broad subject, and should not be treated off-hand. Reciprocity is not so important with reference to South American trade, owing to the diversity of products between North and South America. A large percentage of their products not coming in competition with our own are already admitted free of duty.

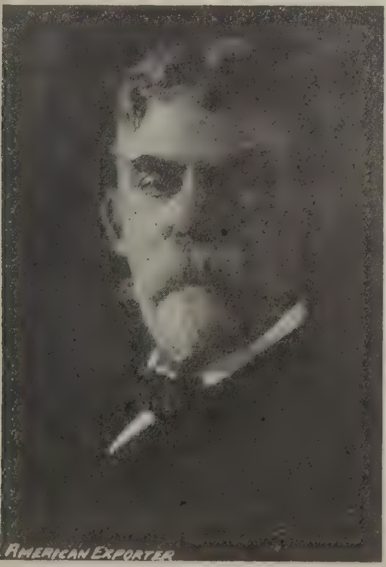
SINGLE TARIFF INADEQUATE.

"In my judgment," continued the Secretary with significant emphasis, "the United States must come to a maximum and minimum tariff. A single, straight-out tariff was all right in a world of single, straight-out tariffs, but we have passed on during the course of years into a world, for the most part, of maximum and minimum tariffs; and with our single rate tariff we are left with very little to defend ourselves from bad treatment. Of course, this is the way it looks to me—that every country in the world can put up its tariff against our products, as compared with similar products from other countries, without suffering, so far as our present law is concerned. Every country in the world knows that if it puts down the rate on our products in its tariff it will get no benefit from it, because we have to charge the same rate to that country that we do to the country which treats us the worst in respect to its tariff rates. The maximum and minimum tariff would be able to free us from one serious difficulty which arises from the negotiating of reciprocity treaties.

"When you make a reciprocity treaty with country A, agreeing to receive the products of that country at less than our regular rates, you are immediately confronted by country B, which is equally friendly with us, and to which we cannot, with good grace, refuse similar treatment, and so on down the list. The result is that there is a tendency, by means of successive reciprocity treaties, to change the whole form of the tariff and to change it without that full and general discussion, without that deliberate discussion of the effect upon all American interests which there ought to be in dealing with this complicated and interwoven question."

NEED OF AMERICAN STEAMERS.

Taking up the question of steamship communication between this country and South America, Mr. Root said that he deplored the present lack of accommodations afforded for this travel by ships plying between the United States and South America, and which fly foreign flags. As compared with the ships from European ports to South American ports, the ships from the United States, he said, are a poor lot.



JAMES W. VAN CLEAVE, PRESIDENT NATIONAL ASSOCIATION OF MANUFACTURERS.

E. S. A. DE LIMA, CHAIRMAN OF COMMITTEE.

MAILS BY WAY OF EUROPE.

"The Postmaster General informs me," added Mr. Root, "that the best way to get dispatches from the State Department to the representatives of the Government in South America is to send them by way of Europe. That condition of things ought not to continue, and one reason why it exists is because American shipping is driven off the sea by two great obstacles interposed in its way—the fact that foreign shipowners receive subsidies from their governments, and that it is impossible for American shipowners to pay the standard of wages made necessary by a protective tariff and the scale of living in the United States, and compete with these foreign subsidized merchantmen. A bill which would overcome this disadvantage to the American merchant marine is now pending in Congress, and," he added with emphasis, "I hope that all of you who agree with me that our Government ought to be fair to the American merchant marine will say so out loud, and will say so in such a way that American public opinion will realize that that kind of fair treatment is not a matter for lobbyists, but a matter of broad American policy.

THE TIME IS OPPORTUNE.

"It is remarkable that just at the time when this country has so increased its tremendous resources of wealth as to be able to turn aside from the internal development and reach out for foreign fields of enterprise and investment, just at this time South American governments are growing out of the disturbed conditions of internal warfare and revolution and are acquiring stability of government.

"There will be safety for property in those countries, and the capacity to protect enterprise, so that we may look for tremendous increase of population and wealth throughout South America, and an enormous increase of the purchasing power. These two conditions together spread before us an opportunity for trade unsurpassed in the world or in our history

BOND OF TRADE ALLIANCE.

"We have been allied politically with these countries, and now we have the opportunity to be allied with them by bonds of personal intercourse and profitable trade.

"With part of our accumulated wealth we are engaging in the great enterprise of the canal. None knows what its effect will be, but the history of the world has been that change in trade routes has powerfully affected the rise and fall of nations, the development of commerce, and the development of civilization. All I can say is that all indications point to the development of American trade between both coasts of our country and the South."

AN EFFICIENT CONSULAR SERVICE.

In conclusion, Mr. Root dwelt upon the necessity of an efficient consular service.

"In the past," he said, "this service has been exceedingly uneven, and many men in it were simply passing the remainder of their lives in dignified retirement. Now the policy is to start young men in the service who have brains and energy, young men who can be promoted for efficiency. This policy we mean to continue."

As Mr. Root closed his address, the delegates to a man rose and gave him three resounding cheers.

ADVICE OF THE SECRETARY OF COMMERCE AND LABOR.

Hon. Oscar S. Straus, newly appointed Secretary of the Department of Commerce and Labor, spoke on "Commercial Relations and International Relations and Their Reciprocal Influence." Mr. Straus very ably discussed our commercial relations with foreign countries and showed the tremendous growth in all branches of our manufacturing industries, which imperatively demand foreign fields for the outlet of our surplus manufactures. He advocated friendly relations with all foreign nations, and drew special attention to the great opportunities existing for American manufacturers in the Orient, South America, Australia and Africa.

Mr. Straus dwelt at length on the growth of the trade relations of the United States with other countries. The sentiment of friendship and cordiality, which has accompanied the development of commerce with foreign nations, should be continued and fostered, he said. By personal relations with the representatives of the various nations in the consular and diplomatic relationship, the prosperity and wonderful commercial development may be continued, the Secretary said.

SOUTH AMERICAN MARKETS SHOULD BE CULTIVATED.

Hon. John Barrett, formerly United States Minister at Panama, Buenos Aires and Bogota, Colombia, said that never in the history of the world had a diplomatic journey been made comparable to that of the Secretary of State during his recent visit to South American countries. Mr. Barrett spoke of the great prosperity and development of the countries in Latin-America, and urged the people of this country to cultivate the friendship of the people and the development of the trade relations. "We should reach out for South American trade," Mr. Barrett said, "with the same effort that we do in our relations with European countries. The field south of us has practically unlimited commercial value, and it is for us to realize this fact."

In conclusion, Mr. Barrett enumerated a few specific but still interesting agencies that demand attention, improvement or development, such as:

The sending of business representatives or traveling salesmen who are always gentlemen and speak Spanish or French.

The manufacture in the United States or adaptation of articles to suit the local Latin-American demand.

The giving of credit to reliable purchasers, as is done by European shippers, instead of always exacting payment in advance or on shipment.

The use of greater care in packing goods for the long distance to be traveled, for the severe changes of climate and for the size of parcels required in different markets.

The opening of North American banks, or branches thereof, in the principal cities of South America.

The inducing of young Latin-Americans to come to our technical schools and professional schools, instead of going to those of Europe.

The popularizing in our schools and colleges of the study of Latin languages, history, institutions, etc.

The early building of Pan-American Railway connections, so that North, Central and South America may be literally united with ties of steel.

The investment of North American capital in the resources, mines, industries, and in the construction of railways, tramways and electric light plants in the more peaceful and progressive countries of South America.

Among the resolutions adopted, most of them unanimously, were the following:

TO RE-ESTABLISH THE AMERICAN MERCHANT MARINE.

We believe it imperative that the American merchant marine should be re-established, and that new steamship lines of direct and speedy communication should be opened, especially with South and Central American and Asiatic ports, for the proper extension of our commerce.

To this end we recommend liberal compensation from the Government to American-built and American-manned ships for all services rendered, including the carriage of mails and the right to use the ships in time of war.

MAXIMUM AND MINIMUM TARIFF.

Whereas, It has become vitally necessary to secure wider foreign markets for our increasing agricultural and manufactured products; and

Whereas, Canada, Mexico, Central and South America, Asia, Australia and Africa afford opportunities for the sale of our surplus under more favorable trade conditions;

Therefore, be it resolved, That this convention invites the earnest attention of Congress to our foreign trade situation and urges early and favorable consideration of a maximum and minimum tariff schedule based upon concession up to 20 per cent. from the existing rates of duties under the terms of which the President may have authority to enter into such commercial connections or agreements as may be deemed essential to the safe-guarding and extension of the markets for our surplus commodities; and

Be it further resolved, That in addition to the granting of discretionary powers to the Executive, we urge the establishment of a permanent, non-partisan advisory board or commission, charged with the duty of studying at all times our trade relations with foreign countries, with a view toward recommending, from time to time, such modifications in customs duties or regulations as may, in their judgment, be necessary or desirable.

Extension of American Banking Facilities.

Resolved, That every proper encouragement should be given by the Federal Government to the extension of American banking facilities, by the charter of an American bank or banks, with authority to establish branches abroad, to grant acceptances and to carry on exchange operations under conditions as favorable as those under which they are carried on by other foreign banks.

Protection of Trademarks and Trade Names.

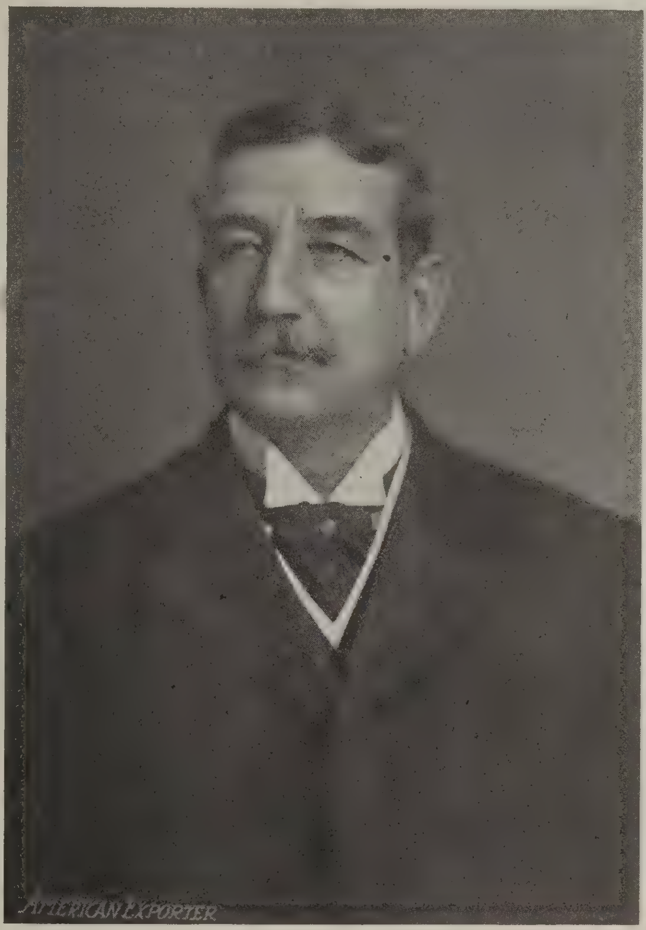
Resolved, That it is the sense of this convention that our Government should be urged without delay to negotiate treaty agreements providing for the fullest possible protection for the trademarks and commercial names of American manufacturers and exporters in all countries with which the United States at present has no such treaty agreements.

Chinese Scholars, Travelers and Merchants.

Resolved, That Chinese scholars, travelers and merchants should at all times be accorded every consideration and courtesy by our port officials.

Condemning Proposed Exclusion of Japanese.

Resolved, That we condemn as impolitic, unjust, un-American and un-Christian, House Bill No. 8975, framed to exclude from our shores citizens of the Empire of Japan.



WILLIAM McCARROLL, PRESIDENT OF NEW YORK BOARD OF TRADE AND TRANSPORTATION, PRESIDENT OF CONVENTION.

Training Men for Foreign Trade.

Another important recommendation adopted by the convention was that the suggestion offered by Jacob Gould Schurman, president of Cornell University, be carried out—to invite fifteen leading college presidents to map out a practical course of business and commercial training for young men who purpose engaging in foreign trade.

Uniform Bills of Lading.

A resolution offered by Francis B. Loomis was adopted providing that the Department of Commerce and Labor be asked to recommend the passage of a law by Congress providing uniform bills of lading with foreign countries.

Permanent Organization.

The opinion was general among the delegates that a permanent organization as a means of carrying out the resolutions and objects of the meeting was most important. In view of this a resolution was passed providing for the appointment of an executive committee, to be selected by the chairman, one member from each State, to present to Congress the resolutions adopted by the convention, and to urge such legislation as may be deemed advisable from time to time. The committee will be subject to call at any time within the next two years, and will meet as representatives of the convention.

Calls Upon the President and Others.

After the adjournment of the convention the delegates called upon President Roosevelt, Vice President Fairbanks, presiding officer of the Senate, and Speaker Cannon, presiding officer of the House, to pay their respects and also to bring the objects of the convention personally to their attention and to ask their co-operation in bringing about the legislation which the delegates believe will do much for the extension of foreign trade.

The President's Approval.

President Roosevelt, at the banquet on Wednesday night, spoke in part as follows:

"I must frankly admit that I never realized the importance of making an effort to strengthen our trade re-

JOHN BARRETT, DIRECTOR OF THE BUREAU OF AMERICAN REPUBLICS.

lations with South America and the Orient—never, in fact, took a very great interest in it until after Mr. Root came back from his momentous trip to South America last summer.

"At the present day the only big ships carrying the American flag which these republics see are our warships. I want them to see some peace ships as well. I want the republics of South America to be convinced not only of our political friendship, but of our trade friendship as well.

Monroe Doctrine Stands for Peace.

"The Monroe doctrine is involved, and there is not in all the world a doctrine advanced by any civilized power which is more emphatically in the interest of peace than the Monroe doctrine. The Monroe doctrine is, of course, essentially one that has reference to South and Central America.

To Build Fast Steamers.

"A bill has been prepared almost exactly in line with Secretary Root's speech at Kansas City. It is not an experimental bill. It is modeled almost exactly on the recent Cunard contract with the British Government. It covers communication with South America and the Orient. The aim is to provide better American lines to the commercial countries of South America, better lines than the present foreign lines of steamships that go there. The bill provides for sixteen-knot ships. In the world's foreign trade at present there are 196 ocean steamships of sixteen knots or more, and of those fully 150 now draw subsidies, postal, admiralty, or both, from foreign governments.

"The bill devotes annually a little over $2,000,000 to building twenty fast steamers for South American lines. Our interests in the Pacific are properly cared for under the bill, for we devote nearly $1,800,000 to sixteen steamers, which will traverse the Pacific Ocean, to take in our Pacific possessions, Hawaii and the Philippines, and the great English-speaking commonwealths of Australia an
New Zealand.

"The bill also provides for a naval reserve, such as we need for our navy. It is a matter of pride to ever American that we now have a navy of respectable size and a good deal more respectable in the character of the ships and of the men aboard them.

"Remember that the prime use of the United State navy is to avert war. The navy is the cheapest insuranc Uncle Sam has. It is the surest guaranty against our eve being drawn into war; and the guaranty is effective jus in proportion as the navy is efficient."

Courtesy to All Nations.

Concluding, President Roosevelt urged "courtesy" t nations as a method of preserving peace.

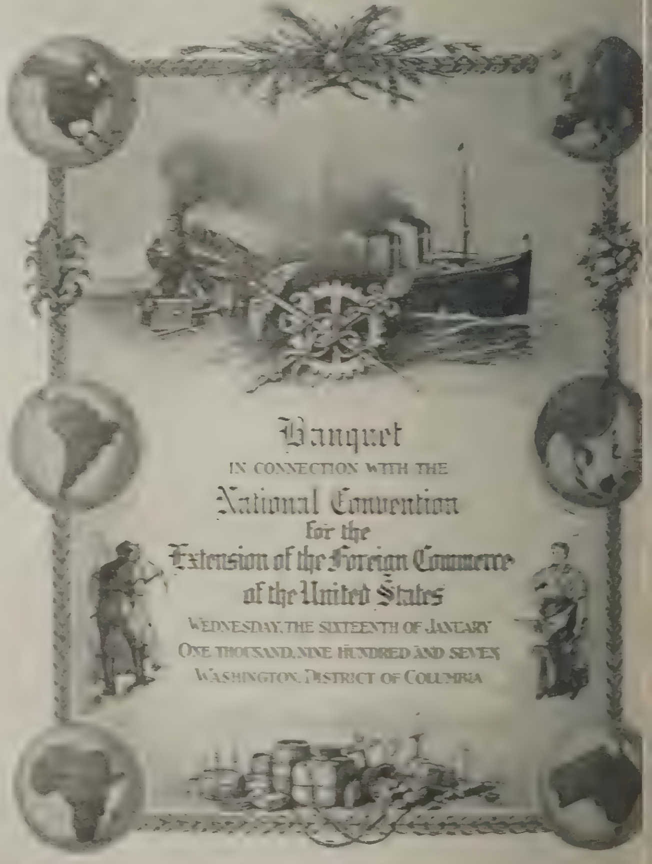
"In our foreign policy," he said, "our aim must be t treat with scrupulous fairness and justice every foreig power, European and Asiatic, large and small. Courtes is not an expensive commodity, but it is a mighty valuab one."

As he advised the convention to continue its goo work of furthering American commercial interests, th President was given three more rousing cheers, the delegates arising to a man.

The Speaker on the Tariff.

Speaker Cannon declared himself in favor of a minimum and maximum tariff. He, however, held that suc minimum tariff should be sufficiently high to protect th industry it is designed to foster.

Continuing, the Speaker took up the subject of sub



Banquet
IN CONNECTION WITH THE
National Convention
for the
Extension of the Foreign Commerce
of the United States
WEDNESDAY, THE SIXTEENTH OF JANUARY
ONE THOUSAND, NINE HUNDRED AND SEVEN
WASHINGTON, DISTRICT OF COLUMBIA

BANQUET MENU CARD.

sidy, and after describing the situation, said it had been well known that his position had long been that money should not be taken from the United States Treasury without proper return therefor. He said he had investigated the subject of upbuilding the American merchant marine, and that those members who had had to deal with the subject had come to the decision that if the bill which was acted upon by the committee the day before were to become a law it would benefit the merchant marine. He assured the delegates that they would have his support, and closed by thanking them for the interest which they had manifested in legislative matters and for the honor they had done him in calling upon him and presenting their views.

AMERICAN EXPORTER
BANQUET IN CONNECTION WITH THE
NATIONAL CONVENTION FOR THE EXTENSION OF THE FOREIGN COMMERCE
OF THE UNITED STATES
THE ARLINGTON
WASHINGTON, D. C.
WEDNESDAY, JANUARY 16TH, 1907

NATIONAL CONVENTION BANQUET.

A Brilliant Banquet.

The banquet was one of the most notable gatherings of the winter, including among its guests in addition to President Roosevelt, Speaker Cannon, Secretary Root, Secretary Taft, Assistant Secretary Bacon, O. P. Austin, John Barrett, and many others high in official life.

Success of the Convention.

At the close Chairman McCarroll said that the success of the meeting lay in the fact that the President and the administration had given assurances of hearty support in the work mapped out by the delegates for the furtherance of American commercial development.

NEW CHILEAN RAILROAD.

A Reuter telegram from Santiago de Chile says: "In an interview on the scheme for the construction of a railway from Tacna to the southern part of the republic the Minister of Public Works declared that the Government had decided upon the building of the railway and would intrust the surveying of the line between Ligua and Tacna to European or North American engineering firms. The survey work would be carried out by engineers sent by these firms, assisted by Chilean Government engineers. After the plans had been approved the same firms would be given the contracts for the actual construction of the railway. These would be given conditionally on the firms undertaking to build various lines, which they would be allowed to work for fifty years with a fiscal guarantee of 5 per cent. and a proportionate sinking fund."

According to statistics published by *Jornal do Commercio* there are 108 cotton factories established in Brazil, with 715,078 spindles and 26,048 looms, representing a capital, including reserves, to the amount of 162,939,953 milreis (at 30 cents equal to $48,881,996), and debentures to the amount of 28,268,176 milreis (say, $8,400,453), consuming annually 30,764 tons of raw cotton, employing some 37,638 hands, and producing annually 234,473,424 metres of gray cottons, prints and fancy goods.

GENERAL VIEW OF OFFICE.

THE AMERICAN EXPORTER'S HEADQUARTERS.

The Eighteen Thousand Foreign Business Men who receive the American Exporter every month will no doubt be interested in a brief description of the headquarters and organization of the publication.

For nearly thirty years the American Exporter has devoted its best efforts toward the establishment of closer commercial relations between importers, dealers and other buyers in foreign countries and manufacturers in the United States.

The general offices of the publication are located in one of the most modern office buildings in New York, where they occupy the entire tenth floor, aggregating 3,235 square feet of floor space.

The different departments include: The business department, the editorial department, the information department, the translation department, and the art and advertisement writing department.

The Business Department.

This department attends to all the regular business matters, including correspondence with the American Exporter's own branch offices, which are in charge of salaried men, and which include offices in the cities of Philadelphia, in the State of Pennsylvania; Boston, Mass.; Cleveland, Ohio; Chicago, Ill.; Denver, Col., and in foreign countries, London, England, and Dortmund, Germany. The extent of the correspondence of this department may be judged from the fact that it receives and sends out every day more than 400 letters.

ENTRANCE TO OFFICES.

The Editorial Department.

In the editorial department almost every leading domestic and foreign journal is carefully read and then filed for reference. The editorial department is in regular correspondence with many hundreds of American manufacturers, and always keeps in close touch with new inventions, improved machinery and manufactured goods likely to interest foreign buyers.

The articles published are origi-

A CONSULTATION IN THE PUBLISHER'S OFFICE.

OFFICE OF THE BUSINESS MANAGER.

VIEW OF EDITORIAL DEPARTMENT.

nal, being prepared either by the editorial staff or by well known writers conversant with the subjects treated. The publication aims conscientiously to serve both the foreign buyer and the American exporter.

The editorial department is always glad to receive suggestions from the foreign readers as to how the American Exporter can best assist them.

Members of the editorial staff call personally on American manufacturers to get information at first hand as to articles suitable for export, and every month new devices and improved manufactures likely to find sale abroad are described and illustrated in its columns.

The Information Department.

The services of this department are for both the American manufacturer and the foreign reader. It prepares specific reports for American exporters anxious to establish an export business, and it transmits to the right manufacturers the many inquiries for particular lines of American goods which reach it from its readers in the different foreign coun-

OFFICE OF ASSISTANT MANAGER.

SECTION OF AD. WRITING DEPARTMENT.

tries. During the last week of January, 1907, the information department received 142 letters from foreign merchants asking for specific classes of American goods.

The information in such letters is immediately sent to the proper manufacturers, and thus the importer, dealer or foreign buyer is put in direct touch with the right producer without expense or commission to anyone.

The information department also recommends foreign agents and importers to American manufacturers seeking representatives abroad. In short, without fee to either side, it acts as intermediary between buyers abroad and manufacturers in the United States.

This department will always be glad to answer questions from any foreign merchant in any part of the world. If he is in the market or interested in a certain article which he does not find in the advertising columns of this publication, he should write to the American Exporter for whatever information he desires, and his inquiry will receive prompt and careful attention. If readers appreciated how thoroughly equipped we are to be of practical service to them, even more would take advantage of this department than now do.

SECTION OF ART DEPARTMENT.

The Translation Department.

This department is composed of a staff of linguists who are experts in their line. Manufacturers in all parts of the country avail themselves of this department for the translation of their foreign correspondence.

How thoroughly the services of the translation bureau are taken advantage of is shown by the fact that during the last eighteen months 21,096 foreign letters were translated in this office for advertisers. Of these 21,096 letters two-thirds were in Spanish and the rest in German, French, Italian, Portuguese, Russian, Dutch, Swedish, Danish, Norwegian, Polish, Bohemian, Greek, Hugarian, Japanese and Chinese. The work was done by twelve different expert translators, natives of the respective countries where such languages are spoken.

In connection herewith it may be stated that about two years ago the publication was acquired by the present publisher, who immediately began to extend its influence at home and abroad.

TRANSLATION BUREAU AND INFORMATION DEPARTMENT.

For more than a quarter of a century Mr. Johnston has been identified with the leading technical publications of this country. He founded the *Electrical World,* now the recognized standard electrical publication in the United States, and was at the head of that publication for nearly twenty-five years. In 1899 Mr. Johnston sold the *Electrical World* and made an extensive tour of the world. Further studies of foreign trade convinced him that some sort of co-operative service should be established between American manufacturers and foreign buyers, and after he acquired the American Exporter he undertook to make it what he thought an export publication should be.

Only a few months later he dispatched the editor to Northern Africa and Europe for the purpose of studying trade conditions in those countries and to find out on the ground in what way the American Exporter could best serve its advertisers and its foreign readers. The publisher himself joined Secretary of War Taft's party to the Orient, where he enjoyed unusual facilities for studying trade conditions in the Hawaiian Islands, Philippine Islands, China and Japan. Upon his return to the United

MAILING AND ADDRESSING DEPARTMENT.

States the business manager of the AMERICAN EXPORTER went to the West Indies and Mexico, while last year the publisher visited South America, attending the Pan-American Conference at Rio de Janeiro, and subsequently visiting the principal commercial cities of our southern hemisphere.

As we said in an editorial in our January issue, "the office of a good newspaper is to represent well the interests of its time."

This is what the AMERICAN EXPORTER stands for, and any co-operation to this effect, from whatever source it may come, will always be appreciated.

A BRAZILIAN MERCHANT ON AMERICAN OPPORTUNITIES IN BRAZIL.

[In the October issue of the AMERICAN EXPORTER appeared an article on "Brazil as a Market for American Manufactures." This was from the pen of the publisher, who had then just returned from a tour of South America. The following excerpt is from a letter recently received from the senior partner of one of the largest machinery and hardware firms of Rio de Janeiro, and which was called forth by that article. What this well known importer and dealer says of Brazil will prove of interest to readers of the AMERICAN EXPORTER.]

It was with just pride that I read your impressions published in the October 15 AMERICAN EXPORTER (EXPORTADOR AMERICANO), under the title "Brazil as a Market for American Manufactures" ("El Brasil como Mercado para las Manufacturas Americanas").

In this article you render a service to the commerce and industry of your own country, as well as of mine, which can only be appreciated by those who, laboring in this branch of activity, know the desire of both countries to work together to further their mutual interests in friendship and sympathy. This purpose unites the two nations in spite of differences of race. Such efforts will do much toward making the people of both countries one in aim and accomplishment and toward securing for this continent the increasing respect of other lands.

I am confident that the visit with which your eminent Secretary of State honored us will tend to cement these sentiments of esteem, at the same time facilitating by acquaintance with our resources the community of interest in the commerce and industry of both countries.

Brazil offers a vast field for the activity of the foreigner who comes here to pitch his tent with us, the more so as there exists here no prejudice of race or religion. The Brazilian in general does not consider anyone a foreigner who comes to co-operate with him in developing the resources of the country, for, as in your own land, the influx of foreigners but adds to the prosperity of the country. Brazil is endowed with a liberal constitution similar to that of the United States, for, in laying the foundation of our own young republican government, we copied from you. Here all are equal, all have the same rights, all constitute one family, with one ideal—honest labor and one creed—love of country.

For the manufacturer, particularly of machinery and agricultural implements, few countries offer a better market than does Brazil.

Outside of the industry of spinning and weaving—the progress of which is due to the superiority of the cotton cultivated in nearly every one of our States of the North—our industries are as yet undeveloped.

The production of cotton is astonishing, there being more than 300 weaving mills scattered over Brazil, and more than one-third of the raw cotton is still exported. The manufacture of furniture and other wooden articles is also flourishing, by reason of the great abundance of beautiful woods, of which there are more than a thousand varieties.

There is also a demand for machinery for the manufacture of hats, shoes, etc., which is now beginning to develop, thanks to the aid of the Government, which imposes only slight duties on imported machinery.

Brazil is especially interested in agricultural implements and machinery. In these lines we have thus far done nothing, though we have the ambition to do everything.

While it is sad to have to make the admission, it is nevertheless true that the majority of our farmers do not know what a plow is, nor do they understand the use of chemical fertilizers. They look scared at the working of a windmill and still thresh their Indian corn with a flail on the beaten ground. Under these circumstances you will understand how large our markets for these articles would be, especially if taken up by enterprising people of inventive and practical genius, such as your countrymen.

For this, however, an active and continued propaganda is necessary, not alone in the commercial centers but among the farmers, by means of advertising matter, including catalogues and descriptive literature of machinery and apparatus. These catalogues should be adapted to the understanding of those for whom they are intended, and should above all be in the language of the country, because here as elsewhere the majority of the farmers do not know even their own language well, much less a foreign one.

A thorough and intelligent propaganda such as this (and one far from remunerative in the beginning) we, as merchants, have endeavored to carry on for our clients of the old continent who entrusted us with the agency and representation of their manufactures. They have seen their own and our efforts bear good fruit, however, and have honored us with their confidence, for which we are grateful. They comprehended early the necessity of co-operating with and assisting the responsible and honest Brazilian merchant who was to introduce and explain their products and their machinery to the Brazilian consumer. These European manufacturers, moreover, sent goods to their representatives without demanding prompt payment, and often without asking payment at all for what was sent for trial or as samples.

As I have said, this propaganda should be made with the consumer, leaving to the merchant the part of intermediary, to supply the demand which is created. It behooves the merchant, as a permanent resident in the country, and always near the consumer, to look after the interests of the manufacturer beyond the sea. It is our work, as agents, to ascertain who would be interested in a certain machine, and to point out to consumers the wisdom of purchasing that particular machine.

The merchant, however, cannot be expected to employ his own capital for the payment of the first machine, besides spending money for salaries and expenses of traveling salesmen. This is the credit to which you refer in your able article, and is the only discordant note in your favorable comments about my country.

Generally speaking, Brazilian commerce at large is carried on by means of our own resources, but at the same time credit—or confidence—should be extended to reputable and well established firms. In many cases we have to sell imported goods to the farmer and retailer on the instalment plan, and American manufacturers should appreciate this, just as Europeans do.

We have not in Brazil enormous private accumulated fortunes, such as exist in your country and in Europe. There are, however, many reputable commercial firms, with fairly large capitals that permit them to pay cash for what they buy, but which it does not always suit them to do, when introducing products of North American manufacture unknown in our market; and for this reason our merchants hesitate to pay the manufacturer in the United States in advance. Here, as well as there, such a rule would be prejudicial to the merchant, because he would employ his capital and labor for the benefit only of foreign industry—in opening the market for foreign products.

It is true that the Brazilian dealer prefers paying for the merchandise he imports ninety days after its arrival. This usage is, however, necessitated by the conditions of our national money system and by the fluctuations in the value of our monetary unit.

This letter is already lengthy, and I might conclude by stating that my class in Brazil does not live on credit; our country has its own resources that warrant any foreigner who has confidence in us in conforming to our method of payment. Now, if you will be so kind as to give this letter a place in the columns of your valuable journal you will oblige me, and I believe render a great service to the commerce of my country and of yours.

LATEST TYPEWRITER SUPPLIES.

Ever since the typewriter was invented the manufacture of typewriter ribbons and typewriter carbon have gone hand in hand, and manufacturers who have for years studied the peculiar need of the different users of these supplies have been able to produce a variety of styles capable of meeting every possible requirement of the business world.

To meet the wide diversity of climate and other conditions which prevail throughout the world, makers of these products have had to devote much time to experimenting in order to produce supplies adapted to each particular place and each particular class of work. The hot, damp climate of Porto Rico calls for a "dry," sharp ribbon; the warm, dry climate of southern California and Europe calls for a "wet" ribbon, while in the Northern States other conditions are met besides changes of summer and winter. Every locality has its climatic peculiarity. Conditions in offices even vary, and these also have to be met.

The essential qualities of a perfect typewriter ribbon are that it will wear well, retain its color, and will not fill the type. Its durability should be such that it will last until cut to pieces by the type, and its color should remain brilliant to the last. Of the several American concerns which have become known throughout the world for the excellence and efficiency of their typewriter supplies, the Corona Supply Company, of Rochester, N. Y., takes a leading place. These manufacturers have catered to the needs of typewriter users for a number of years, and have won the reputation of being able to satisfactorily fill any demand made upon them. Their ribbons have been universally accepted as the standard of excellence, and their line includes ribbons of any color desired and for use on any typewriter, including all makes of billing machines.

The ribbons are clean and will not smut or fill up the type. They are durable, and it is claimed that with ordinary use they will wear three or four months. The color is brilliant to the end and does not fade, a feature that makes them invaluable for permanent records. The principal ribbon put out by this concern is known as the "Corona" brand. It is made in any color or combination of colors, for record or copying, and for any make of machine.

Equally well known and as extensively used is the carbon paper made by these manufacturers. Their most important brand, which also is styled the "Corona," is said to embody every essential characteristic of a perfect carbon paper. It gives a clear-cut, sharp impression, and an address filled in on one or two duplicate copies is not distinguishable from the original. The carbon is easily erased and corrected without blotching or smudging, being free from grease, and it is so clean that it can be handled without in any way soiling the hands.

An imported tissue is used in the manufacture of the carbon. This is of exceptional toughness and strength, but of lighter weight than is ordinarily used. It is coated by a special process, which evenly combines the ink and paper, thoroughly saturating the paper with the colors, and making a product of unusual strength and durability. It never dries up and hardens, and nearly every trace of color will have left the paper before it need be replaced. It is claimed that an operator with an even, light touch can easily get over 100 sharp, clear impressions from a single sheet. This paper comes in both standard and light weight, the former being the more generally used. The light weight is only used when an extraordinary number of impressions is needed.

This concern also manufactures pen and pencil carbon, both single and double faced, in all standard weights and colors. Their copying carbon paper is also much used, as it is invaluable for many purposes. Carbon copies made from this paper may in turn be copied in a letter-book, or on a roller copying machine.

FLEXIBLE ARM ATTACHMENT FOR PORTABLE ELECTRIC LAMPS.

The many advantages of portable lamps in the office, shop and home, are so apparent as to scarcely need any enumeration. There is nothing more essential for a perfect lighting equipment than provision for changing the direction of a lamp's rays at will. Wherever light is required, it is desirable to bring the rays direct on the work, to do away with all shadows and glare, to screen the eyes of the user, and to get the full benefit of every ray. Flexible tubes, like those illustrated herewith, offer the most satisfactory means known for meeting these requirements. They may be used on brackets or desk portables in offices, homes or factories; in fact, anywhere where electric lights are used. By the use of this tube a lamp can be made adjustable into almost any conceivable position, and there are no screws to turn or to work loose, nor anything about the apparatus to get out of order or cause annoyance.

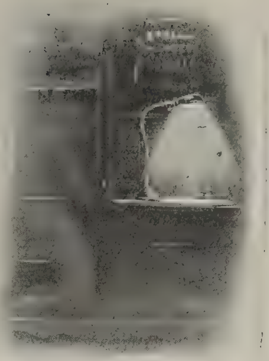
In the office there are hundreds of ways in which these tubes can be applied to advantage in connection with lighting. To light an office properly it is not merely necessary to have a large number of lights, but to have the light so diffused that it will strike directly on the work being performed.

In the factory and shop the great value of the portable lamp is becoming more and more appreciated, as it is well known that the maximum productive capacity of a shop or office cannot be reached if the lighting facilities are inadequate. Any mechanic who has set up work on a lathe or similar machine by light hung somewhere where it is out of the way, can fully realize the loss of time by reason of poor light. What is required is a lamp that can be adjusted to shed its rays over the desired space when needed, and still be out of the operator's way. For arranging such lamps nothing is more adaptable than the flexible tubes. This attachment on a portable lamp provides light on any machine tool, table or desk, and in just the place desired.

These flexible arms can be made a permanent fixture to any machine tool, such as a lathe, planer, slotter, boring machine, etc. No workman can keep up his standard of fine work when laboring under the handicap of poor light, and by having a portable lamp arranged on his bench, on the side wall or a nearby post, there is no waste of time or material during the closing hours of the day, as is the case in many factories where lighting facilities are poor.

CAN BE ATTACHED TO ANY MACHINE.

A 16-candle power lamp, when hung perpendicular, gives its full capacity only in a horizontal direction, and but 4 to 7 candle power in a downward direction—the light through the end of the bulb. Changing lamps from a vertical to a horizontal position more than doubles the light below the lamp. With the flexible arm the broad side of the lamp can be turned in the direction light is required, whether downward, upward or in a horizontal direction. Thus the full candle power of the lamp can be directed on the work, and if a reflecting shade is used a fourfold strength is obtained.


ON THE WRITING DESK.

A more comprehensive idea of the efficiency of the flexible arm may be gained by a glance at the accompanying cuts. A large Brooklyn, N. Y., concern are the manufacturers of this tube, and they have installed their equipment in many of the largest buildings and prominent institutions throughout the country. The tubes are so flexible that they may be bent in any direction, and will remain in whatever position they are placed until readjusted. They last indefinitely, and neither time, frequent adjusting nor atmospheric changes affect their flexibility. They are made of tempered steel and copper wire, and may be had in any length desired.

For writing at a table and for a reading lamp the portable lamp is superior to any kind of light that can be provided. Its many advantages in the home are readily manifest. In the library or study it eases and protects the reader's eyes, as he can adjust it so as to eliminate the glare from book or paper and throw a steady, well diffused streakless light in any direction that makes reading easy and is least tiresome to the eyes. The flexible tube makes it possible to place a lamp in either a high or low position, and in case of sickness or for the use of invalids it can be placed on a chair or table near the bed.

The expense of installing this system in factories or shops is said to be considerably less than the old way of stringing wire from the ceiling. Where the lights are placed along a bench or table a hole is bored in the top of same and a nipple connected to the pipe underneath. Above the table are the nipple, the flexible arm, the lamp, shade and socket, which

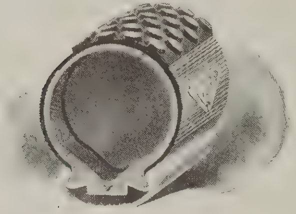
FOR THE MUSICIAN.

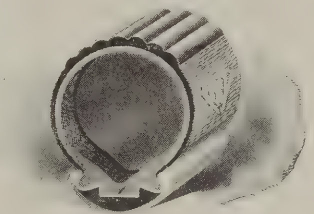
constitute the entire equipment. In one of the leading shoe factories of Rochester, N. Y., over 500 of these flexible arms are used in the fitting and cutting departments alone, every operator having an individual light. The system of installation in this plant is said to be one of the most complete and modern factory lighting systems in use.

NEW MOTORCYCLE TIRE AND RIM.

The accompanying illustrations represent a tire and rim which embodies some new improvements in this class of motorcycle equipment. The tire is made on the same lines as bicycle tires, which, as is well known, are the easiest of all detachable tires to handle. With this construction of tire and rim it is said to be impossible to ever pinch the inner tube, consequently the tire cannot blow off the rim.

The rim is a hollow two-piece arrangement of attractive shape, having the same style of grooving as the wood bicycle rim. The rim is, owing to its construction, very stiff, and it is practically impossible for it to get out of true in use.


BAILEY TREAD TIRE.


CORRUGATED TREAD TIRE.

The manufacturers, the G. & J. Tire Company, of Indianapolis, Ind., make these tires in both the regular corrugated tread and the Bailey tread. It is said that practically all of the exhibitors of motorcycles at the exhibition held last month showed samples of this tire and rim on their show machines.

The company is now prepared to supply 2¼ and 2½ inch rims and tires of this new construction, and within the next week or two will be in position to also supply 1¾ and 2 inch sizes.

A MODERN FISHING TACKLE FACTORY.

The town of Akron, Ohio, boasts of being the centre of the fishing tackle industry in America, its claim to this distinction being based on the fact that for more than a quarter of a century it has been the headquarters for what is now one of the largest fishing tackle manufacturing plants in the world. The business was established in 1880 by E. F. Pflueger, under the style of the Enterprise Manufacturing Company, and on the death of Mr. Pflueger in 1901 it passed over to the management and control of his four sons, who have since conducted it with the same success that has always characterized its development.

IMPORTANT FISHING TACKLE PLANT.

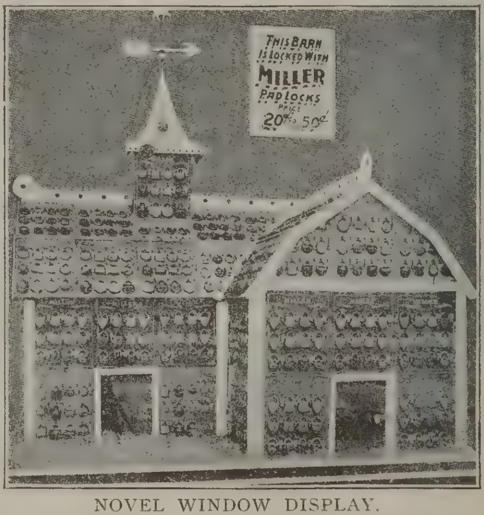
In order to keep pace with its rapidly increasing trade the company has recently made a large addition to its plant, thereby nearly doubling its producing capacity. The new building is a five story structure, 100 by 50 feet in ground dimensions. The business has been steadily growing from year to year, and the services of several hundred persons are now required to take care of the plant's large output. During the season of 1906 the company is said to have sold from 100,000,000 to 150,000,000 fish hooks of its own manufacture, a good percentage of this number going to foreign countries.

The company's fishing tackle catalogue for 1907 is an index to the size and importance of its business and is of interest to all jobbers and dealers in tackle. It contains hundreds of illustrations, and all the fish hooks are pictured in their actual sizes, from tiny "Limericks" to big hand made cod and halibut hooks.

An interesting section of the new catalogue, which bears the distinctive number F25, is devoted to Pflueger's artificial flies, the most popular patterns of universal reputation, suitable for trout and bass, being listed, illustrated and described. All sorts of spinners and mechanical baits are included in the pages of the catalogue, the cuts are properly displayed, and the descriptive reading matter is comprehensive and interesting. A large section is devoted to reels, floats, etc., and innumerable accessories of the complete fishing outfit are duly listed. Dealers can secure this fishing tackle catalogue on request.

UNIQUE WINDOW DISPLAY.

There is a unanimity of opinion that window displays bring good returns, and it is surprising that a greater number of merchants do not give more attention



NOVEL WINDOW DISPLAY.

to this selling end of their business. The prize window display shown herewith very attractively sets off an important line of the hardware trade. Some time ago the Miller Lock Company, of Frankford, Philadelphia, Pa., offered prizes for the best display of their lithographed card assortments of "Miller" padlocks. This display was made in response, and our readers will no doubt agree in the opinion that it is a good one, well calculated to attract attention. The Murphy-Maclay Hardware Company, Great Falls, Mont., who designed this show window, advise that displays which do not require much labor are changed about every week or ten days.

In the display in question, the barn was built of boards, after which thirty-nine display padlock cards were nailed on. The sides of the barn were covered with red cards, the roof with green, and the gables with drab, making a red barn with green roof, etc. The floor of the store window was covered with an imitation grass, made of excelsior dyed a green color. The back of window and sides were covered with light green cloth. The window used measured 8 feet long, 9 feet high and 6 feet deep. The display attracted much attention, and led to a great increase in padlock sales, not only in the "Miller" lock but in the various other styles handled by this company. Its output averages 10,000 and upward per day, including locks of many grades and shapes for export and home trade.

POWERFUL ANIMAL LIQUID GLUE.

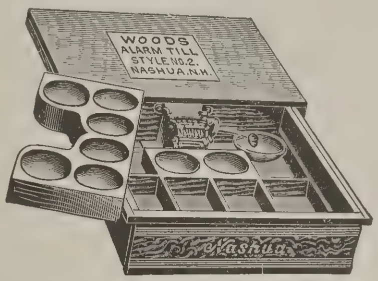
It is a generally conceded fact that hides and hoofs are among the best materials from which glue can be made, but the problem of making liquid glue from these products so that it would not become hard without the use of acids was one that interested chemists for a good many years before it was successfully solved. An adhesive compound that possesses this advantageous quality is put out by a Boston, Mass., company, and it is now in use in all parts of the country. It is a glue distinctive for its excellence and careful preparation, and its powerful adhesive qualities have been demonstrated in innumerable severe tests. Its makers style it the "Holdfast" animal liquid glue. It will remain in a liquid state as low as 40 degrees Fahrenheit. At this low temperature, by simply holding the can or tin in the hand, the heat of the blood will, within a few seconds, soften it ready for use, which is a feature quite unusual in compounds of this nature.

This glue is especially adapted for holding together all kinds of wood, leather, metals, etc. Its makers, the Holdfast Glue Company, of Boston, Mass., put it up in bulk and in cans and tins of all sizes suitable for all purposes. It is also put up in small cans for family use. The company also manufactures various other kinds of animal glue to suit all purposes for leather concerns, boot and shoe manufacturers, etc., besides manufacturing a practical and efficient animal cement for mending glass, crockery-ware, china and similar articles.

UP-TO-DATE ALARM CASH DRAWERS.

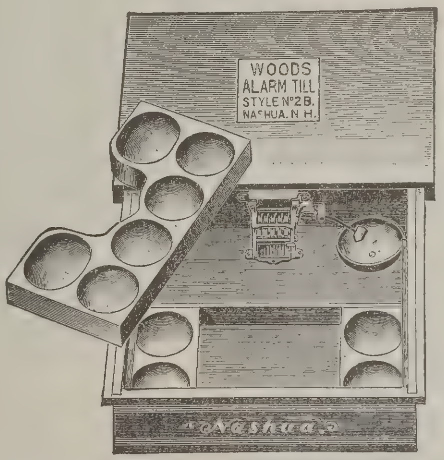
For practical utility and service, few cash drawers now in use have proven of as great efficiency as the ones illustrated herewith. The makers of these tills are large manufacturers of this class of appliances, and they have a world-wide reputation for producing standard products.

The drawer shown in first cut is a favorite style, and it has many features to commend it to users of this class of machine. For safety, convenience and durability it is said to be unsurpassed. The lock has 32 combinations, which can be changed instantly; the set, or combination, cannot be detected, and the alarm does not sound except when an attempt is made to open the drawer by an unauthorized person. In addition to the compartments for coin there are four spaces for bank notes and bills.



ALARM CASH TILL.

The till shown in the second illustration, which is manufactured by the same concern, the Nashua Till Company, of Nashua, N. H., is made entirely for export. It is identical in every way with the drawer described above with the exception of the space for money in the bottom of the drawer. In this till, arrangement is made to accommodate English money. The sliding coin cup has four round and two oval shaped bowls, under which are two cups and two bowls on either side of the drawer, leaving a large space for bank notes, bills, etc.



CASH TILL FOR EXPORT.

In designing these cash drawers, the greatest attention was given by the manufacturers to every detail of their construction, and the material, workmanship and finish are the very best. The drawers are made either with oak or black walnut front, varnished and polished.

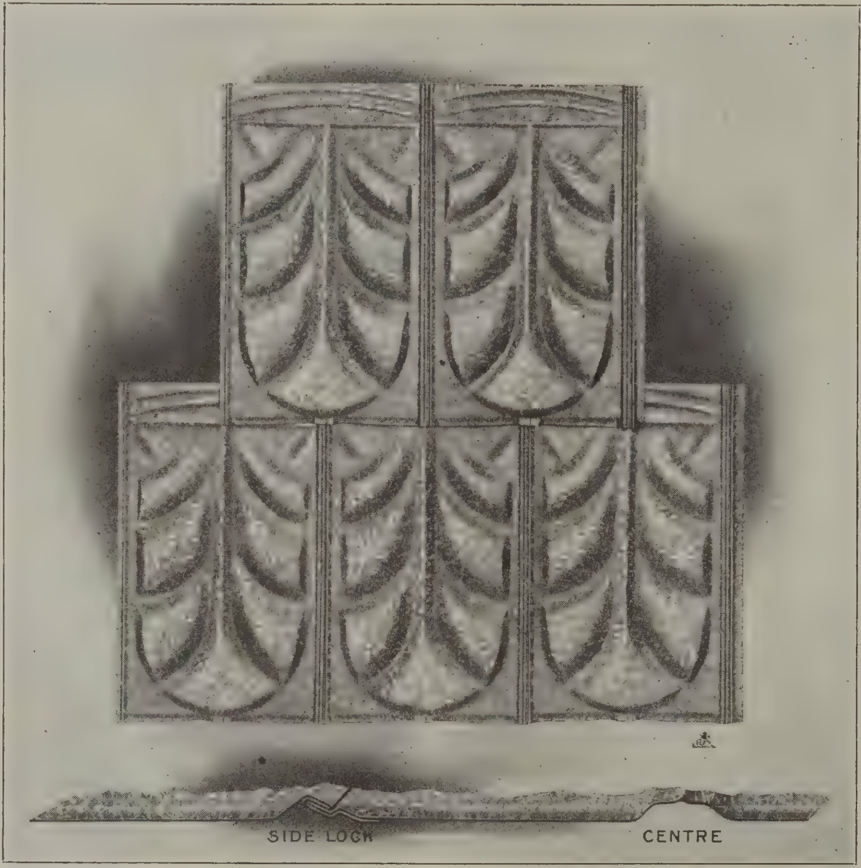
The sides, back and half globe sliding coin cup are of hardwood, finished in oil.

This company makes a variety of cash drawers, also adjustable steel nickel plated brackets for holding shelving in showcases, and other specialties. Its cash drawers have been universally adopted, and the demand for them is very large.

METAL SHINGLES.

The various styles of shingles manufactured, those of wood, slate, tile, tar and gravel, etc., have all been in use for a sufficient length of time that the relative merits of each, particularly as to durability and cost of repair, are very well known to builders. The latest acquisition to this branch of building construction is the metal shingle, for which many superior features are claimed.

It is known as the New Century shingle, and is the result of years of practical experience and experiments. Its construction is said to combine the qualities of economy, utility, artistic appearance and safety. It is fireproof, and its ornamental design fits it for use in the most expensive buildings. In the construction of public buildings, churches and residences, the use of these shingles is being quite generally adopted, with the most gratifying results. The life of these shingles is one of their most important features. Being fireproof, with ordinary care they will last as long as the building which they cover.



METAL SHINGLE, SHOWING SPECIAL FEATURES.

The shingle is made of prime charcoal roofing terne. After it is embossed and the locks are formed and the shingle is made complete, it is dipped into a vat of red paint especially prepared for this purpose. By the dipping process the paint finds its way into the apron of the locks, and every part of it is thoroughly covered. In the drying process the greatest care is taken, so that the coating becomes hard and adheres perfectly.

The embossing plays a most important part in the preparation of the shingle. It is that which gives it its beauty of finish, combined with strength and rigidity, preventing buckling, providing large air space, adding to its durability by keeping it dry and cool, and discharging the water over the entire surface. The embossing also admits of the free and uninterrupted circulation of air on the under side, which prevents the accumulation of moisture and its results, rust and corrosion.

The lock is perhaps the most important part in the construction of any shingle, and in designing this metal shingle its makers, the Chattanooga Roofing and Foundry Company, of Chattanooga, Tenn., bestowed much thought on this feature of its construction. Sufficient allowance is made for expansion and contraction under extreme temperatures. This prevents buckling in hot weather and pulling apart in very cold weather. The lock is of the same height on the two edges, making it impossible for storms to beat from either direction through or into the lock. The under side is raised, which prevents any possibility of leakage.

The accompanying cut shows the shingle and some of its important features. In the small cut at the bottom, the side lock is shown.

After the shingles are laid it is usually desirable to give them a second coat of paint, as shipping and handling scratches the first coat more or less. The first coat they receive is of the best obtainable red paint. The second coat should be of mineral or graphite paint, and any color to suit the taste of the owner.

The Century Cement Machine Company, Rochester, N. Y., makers of the Hercules concrete block machine, have just issued a very handsome and profusely illustrated catalogue setting forth the merits of their 1907 model Hercules, and explaining the improvements. A copy of this catalogue will be sent to anyone who may be interested.

IMPORTANT EXHIBIT AT CHICAGO ELECTRICAL SHOW.

At the second Annual Electrical Show, held in Chicago last month, one of the most extensive and interesting exhibits was that of the H. W. Johns-Manville Company, of New York. Among its numerous other electrical specialties, which have become so well known to the general public, the company had on exhibition a line of direct reading instruments which attracted unusual attention. These consisted of direct current volt and ammeters, combination meters, both switchboard and portable types, as well as a special combination meter for automobile use.

The combination meters, which the company puts out under the name of "Victor," are said to be the only direct reading electrical instruments of the kind on the market giving a simultaneous reading of volts, amperes, watts and horse power on one dial. The device consists of a voltmeter and ammeter, and is therefore practically two separate and complete instruments combined in one case, and so arranged that the indicators cross each other, each acting independently of the other, so far as volt and ampere readings are concerned. The readings in watts and horse power are obtained from the point of intersection of the two indicators. This meter is said to be one of the few switchboard instruments now being made that give a reading in watts and horse power, and inasmuch as it combines four instruments in one it requires only the space of a single instrument, thus adapting it to the smallest switchboard panels.

Another material exhibited was the company's "J-M" friction tape, which is recognized as one of the best of the high-grade tapes now in use. In this tape the friction is well worked into the fabric and runs true to gauge throughout the entire roll. This tape is said to possess an extremely long life under all conditions.

"Noark" subway and service boxes were shown of one, two and three pole construction and 250, 600 and 2,500 volt capacity. In addition to their other advantages, these subway boxes are water tight, being designed and tested to withstand a pressure of 25 pounds per square inch without leaking, and are therefore suitable for the most severe conditions. Also a complete line of National standard fuses, blocks and accessories, and overhead line material was shown.

"Transite" controller linings, another feature of the exhibit, are made of asbestos fireproof lumber, an insulating material which prevents short circuiting or grounding of controller cover. This asbestos lumber is also made in the form of fireproof doors for high tension transformers and switches, in which case it serves to protect the apparatus from short circuiting and to prevent persons from coming in contact with the live parts.

The *Journal de St. Petersbourg* states that the Russian Government intend, as soon as possible, to improve the telegraph service of that country by constructing lines to link up the small outlying towns with the chief town in each district.

AN EXCELLENT PROTECTIVE PAINT.

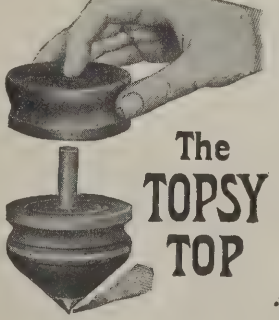
For the protection of structural iron and steel, machinery, stacks, tanks, pipes, etc., from rust and corrosion due to moisture, acid fumes, alkali dust and electrical currents, an elastic, impervious paint, neutral in its nature, adhering firmly and affording an efficient protective coating, is necessary.

After a long period of experimenting a Syracuse, N. Y., company has placed upon the market a product known as Crysolite Protective Paint, which is said to fulfill all of these requirements. It covers well, makes a fine finish, is easily applied, either to cold or warm surfaces, withstands the effects of weather conditions, and has most excellent acid-resisting properties. In both this and foreign countries where the paint has been introduced it is meeting with unqualified success, and the demand for it is large and rapidly increasing. The export agents for the product are Fuerst Brothers & Co., of New York City.

POPULAR SPRING-WINDING TOPS.

With the average boy top spinning is ever a popular and fascinating form of amusement, and the greater the action and hum with which they are accompanied the more pleasure they afford. The tops illustrated in the accompanying cuts are said to have been two of the season's most popular sellers. While they differ in appearance and construction, each has features that cannot but delight and please the fancy of any child. No string is needed, the spring-winding principle being used in both.

The larger of the two is styled by its makers, the Gibbs Manufacturing Company, of Canton, Ohio, the "Never-Stop" top. It measures 10 inches in circumference, is made of indestructible metal and is spun by an automatic spring device, which cannot get out of order. It is most pleasing to the eye, being ornamented in bright colors, and spins for a remarkably long time, humming musically until it comes to a stop.



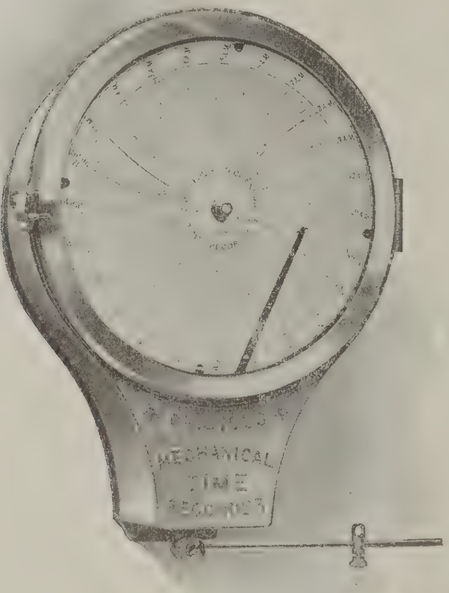
HUMMING TOP.

The second illustration represents the company's "Topsy" top. This is said to be particularly amusing, as it spins at either end. It is prettily painted and striped in four colors.

NEW RECORDING INSTRUMENT.

To fill the continued and increasing demand for an instrument which makes a graphic record of variations of mechanical movements, and the time of such variations, the Bristol Company, of Waterbury, Conn., has placed on the market the instrument illustrated herewith, to which it has given the name Mechanical Time Recorder.

A circular chart revolves by clockwork at uniform speed, while the pen moves over the chart an amount proportional to the motion to be recorded. The chart measures 8 inches in diameter. Clock movements can be supplied for complete revolution of the chart once in 15 minutes, 1 hour, 2 hours, 3 hours, 4 hours, 6 hours, 8 hours, 10 hours, 12 hours, 24 hours, or 7 days. Thus it will be seen that the speed may be selected to give best results under all commercial requirements.



TIME RECORDING MACHINE.

The pen arm is rigidly attached at its lower end to a shaft which is turned by a short arm projecting through a slot in the bottom of the case. The lever projecting to the right, as shown in the cut, is clamped to the short arm by a thumb nut. This lever is adjustable and can be clamped to the arm at any convenient angle.

The motion to be recorded, after being properly reduced, is imparted to the lever, which in turn transmits it to the pen. The total scale on the chart is usually taken proportional to the total motion to be recorded. Reduced motion, if necessary, can easily be arranged by the aid of pulleys, levers or other reducing devices.

Fine adjustments can readily be made by applying the motion at the proper point along the lever, and to facilitate this a metal attaching piece is provided which is adjustable on the lever arm and secured in any position by the thumb nut. By the aid of the adjustable lever arm and the adjustable slide on the arm, the instrument is most conveniently adapted to record motions of all amounts and directions. Total deflection of the pen is obtained by turning the lever through an angle of about 21 degrees or 5 inch motion at its outer end.

This instrument can readily be used to record the rate of motion and position of sluice gates, turbine or engine governors, gate valves, etc. It is also adapted for recording the rise and fall of liquids in tanks, rivers, reservoirs and for bays. In the gas industry it can be used to check up the operators and thus prevent the "blowing" of the holders either day or night.

GROWTH OF THE READY ROOFING BUSINESS.

In the past ten years there has been a steady increase in the growth of the ready roofing business, and practically all of this kind of material has been made and shipped from the United States. Europe, South Africa, Australia and South America have imported large quantities of ready roofings to be used on plantations, for industrial plants, railways, mines and other purposes.

Ready roofings have many advantages over other kinds of roofing materials. They weigh less, are easily transported, occupy little space, and can be applied to a roof by anyone. There are as many as twenty-five different brands of ready roofing and as many different qualities. Some of these roofings have been used on railroad, United States Government and other kinds of buildings for ten years, and are still in good condition. The best of these roofings are said to be more economical than shingle, metal and other kinds of roofings. Hundreds of thousands of rolls are made annually in the United States, and the ready roofing business is advancing very rapidly each year.

In the city of East Walpole, Mass., is located one of the oldest ready roofing plants in the world, that of F. W. Bird & Son, makers of the well-known Paroid roofing. The business was established in 1817, and the products of this concern are recognized as standard throughout the world. They make a specialty of the Paroid roofing, and no effort has been spared to make it a perfect product of its kind. It is made from the best felt, thoroughly saturated and coated with a compound that renders it absolutely waterproof. It contains no tar, and in appearance is very much like slate. It withstands any and all weather conditions, and is remarkable for its lasting qualities.

The roofing comes all ready to put on, in rolls 36 inches wide, each roll containing 216 square feet. It is very easy to put on, and each roll comes complete with fixtures and directions for applying.

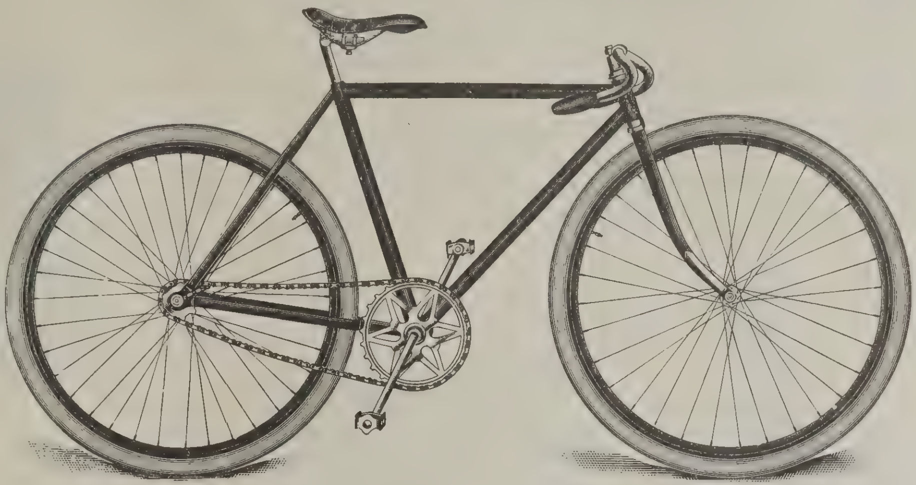
The Isthmian Canal Commission, Washington, invites proposals until February 18 for the supply of steel rails, splice bars, tie plates, track bolts and skipes, nut locks, stove pipes, rubber gaskets, fire brick, cupola lining blocks, wagons, platform scales, safes, furniture, towels, window curtains, etc.

SOME OF THE NEWEST MODELS OF BICYCLES.

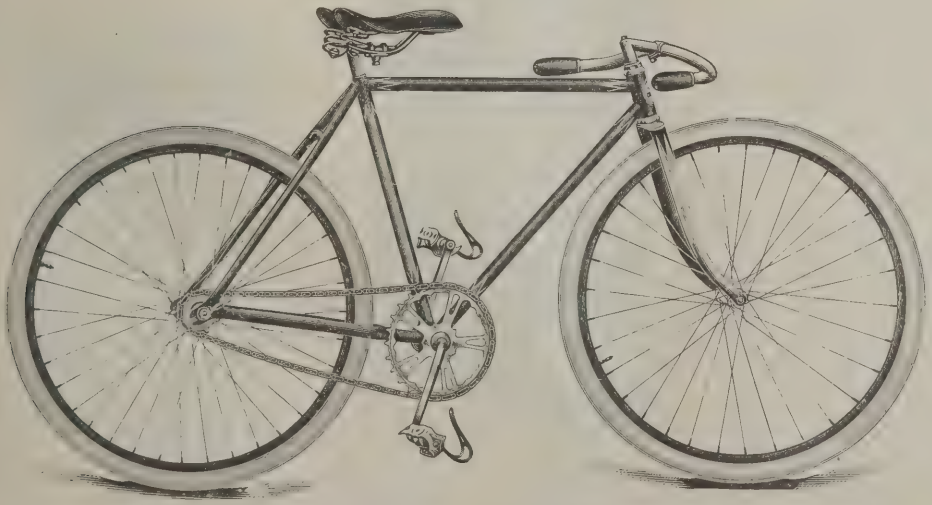
Long experience in catering to the demands of the wheeling public has taught bicycle manufacturers many practical things, which knowledge they have applied in the construction of their machines, with the result that the modern bicycle has attained a degree of excellence that leaves little room for the suggestion of improvement.

In the accompanying illustrations are shown two of the most perfectly equipped and up-to-date machines now being manufactured. Their makers have been engaged in the manufacture of bicycles for over fifteen years, and in these two models they have embodied every desirable and improved feature in cycle construction. The machine shown in first cut is their newest design, and the greatest care and attention have been devoted to the most minute detail of its construction. It was especially designed to meet the constantly increasing demand for wheels of the best quality, with all the latest improved features. It is known as the Ranger coaster brake special, and it is built to withstand the enormous and sudden strains put upon it by the coaster brake.

This coaster brake feature is considered one of the most important improvements in cycle construction. With the aid of this device the rider may coast for miles with no further effort than is necessary to guide the machine. He can coast down hills with perfect safety at twice the speed he would dare to make with the ordinary bicycle, and this extra momentum will carry him to the top of the next hill without effort. The wheels of the machine are made with the finest grade double-swaged wire spokes, each individual spoke guaranteed to a tensile strength of over 475 pounds. The chain is of the detachable, open link type, and can be taken apart at any point without tools. The pedals are a new improved rat trap style, and are very light running. The saddle is of the high back cavalry pattern, with coil spring, and is made of hand buffed grain leather. The handle bar is made of seamless tubing, triple nickel plated over a heavy coating of copper. It can be adjusted to any of the many positions between a low drop and a high up-turned. Another most important feature is the puncture proof tires with basket weave tread. This style of tread not only prevents all possibility of side slipping on wet or muddy roads, but runs fifty per cent. easier on asphalt pavements for the reason that all "suction" is eliminated. It is impossible for the tire to stick and drag on pavements, as the tread is so made that there is always a small quantity of air between the tread of the tire and the pavement. In every part of the construction of this machine the same high standard of excellence is maintained; it is one of the most highly finished and easy running machines now being manufactured, and is proving one of the most popular models ever turned out by this company, the Mead Cycle Company, Chicago, Ill.


"SENTINEL" ROAD RACER.

Another model for which they have a large call is known as the Sentinel road racer. It is built for that class of riders who are looking for a thoroughly strong and reliable wheel at moderate cost. It is strictly a business bicycle, and for hard country road riding there is said to be no better wheel made. The best of everything is used in its construction, and no pains have been spared to make it first class in every respect. The frame is made of seamless tubing, with flush joints throughout, carefully reinforced and securely brazed. The handle bars are of seamless tubing, and are adjustable to any height desired. The crank hanger, sprockets, chain, pedals, and saddle are all of the most improved patterns. The tires are of the Hedgethorn puncture proof style, the same as are used on the Ranger machine

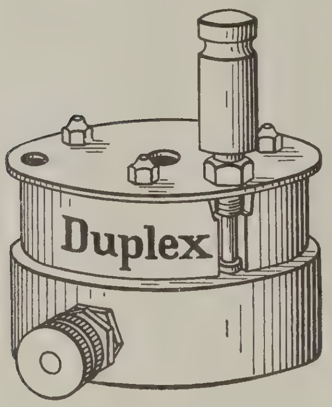

RANGER COASTER-BRAKE.

described above. Every machine turned out is supplied with a tool bag complete, with necessary tools, such as wrench, oiler, pump, repair kit, etc.

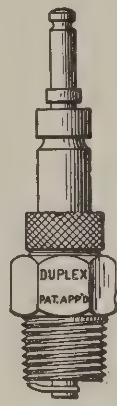
In addition to the above mentioned wheels, this company makes many other styles, to meet varying demands, including ladies' wheels, also different models for boys and girls. Another very popular model is known as the Ranger roadster. It is said to be one of the most reliable and practical bicycles now in use, and is equipped for the fastest kind of traveling. This company is one of the largest exporters of bicycles in the United States, and its shipments to foreign countries yearly are said to run well into the thousands. For export shipment all machines are carefully greased with vaseline, wrapped in heavy waterproof paper bags, and securely crated, thus insuring delivery in perfect condition.

DUPLEX SPARK PLUG AND ATTACHMENT FOR GASOLINE MOTORS.

The Duplex Ignition Company of New York is manufacturing a device that acts as a protector of spark plugs from water, and removes mis-fires without stopping the motor. The manner of operating it is very simple. By pulling out a switch, as shown in the larger illustration, the device accomplishes its work.



THE ATTACHMENT.



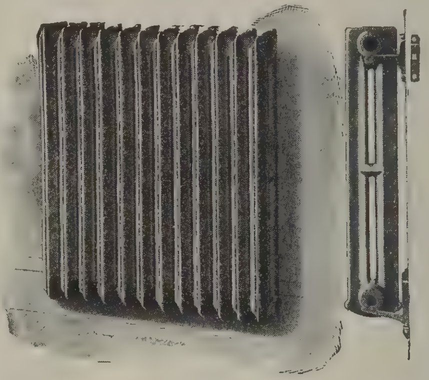
SPARK PLUG.

It has the great advantage that the switch may be operated while the motor is in operation, and there need be no fear of an electrical shock. The attachment works on the principle of a condenser discharge, and overcomes any difficulty of fire, whether the latter is caused by oil, soot or a cracked porcelain.

This concern is also manufacturing a spark plug that acts on the same principle, and an illustration of same is shown herewith. When missing fire on account of soot or oil the switch is pulled, and the plug will immediately fire perfectly. It avoids stoppage of the motor on the road, cleaning of plugs and other annoying features. The simplicity, durability and efficiency of the device have won for it marked favor among owners of automobiles. In this country it has been widely adopted, and the foreign demand for it is said to be rapidly increasing.

STEAM AND HOT WATER RADIATORS.

The subject of radiation, one of the most important branches of the heating industry, is one to which manufacturers of this class of apparatus have given such close and exhaustive study that there is practically no demand in this form of heating which the radiators now being produced will not fill. We present in the accompanying illustrations some late patterns of steam and hot water radiators, the products of one of the oldest and largest manufacturers of steam and water boilers, radiators and sanitary supplies in the world. The types shown here represent the results obtained from years of experimental and practical demonstration, and they embody every desirable feature known in radiator construction, being handsome in design, symmetrical in form, durable and effective in operation.



WALL RADIATOR.

The line of heating apparatus made by this concern, the Pierce, Butler & Pierce Manufacturing Company, of Syracuse, N. Y., is complete, and includes radiation for every possible need. Its principal makes the company puts out under the names of the "Louraine," "Syracuse," "Bremen" and "Reliance," and these are made for either direct, indirect or semi-direct heating. The various styles shown here are all adapted to the "Louraine" radiation, which is said to be practically all that is needed by steam fitters in making the majority of installations.

DINING ROOM RADIATOR.

SEMI-DIRECT RADIATOR.

The first illustration shows a single column radiator without legs, used as a wall radiator by employing brackets, as shown in the sectional view. When adjusted these brackets are, of course, invisible. The three column dining room radiator is of the ornamental type. It is furnished with a spacious warming closet, surrounded on the bottom and both sides with direct heating surface. The closet is built with double doors and two shelves 10½ inches wide by 17 inches long, which may be removed at any time more space is required.

In the last cut is shown a semi-direct radiator. This resembles the well known "Louraine" radiator put out by this company, with the exception of the lower half covered by the semi-direct ventilating base. This base can be bolted to any of the company's three column radiators to cover any number of sections. A damper operates from the front, and this admits air to the radiator from the floor or directly from the outside wall to be heated in such quantities as may be desired. In extreme weather this damper closes the outside fresh air opening if desirable. These, as well as all the other radiators made by this concern, may be had either plain or ornamented.

The radiators are connected with extra heavy push nipples, which absolutely insures them against leakage. The various shapes of the radiators and the delicate lines of embossing are such that they will harmonize with all styles of interior finish. They may be had in any height desired; in fact they are built in so many different dimensions that they are readily adaptable to any service.

A form of radiator put out by this company which is meeting with constantly increasing popularity is its "Louraine," made in graduated sections. They are said to offer more radiating surface than the regular type, and their use in hallways or in courts along stairways is now universal. This type makes a most effective radiator for use beside stairways, and the upright sections in the lower heights give excellent service under window seats and in alcoves. The "Reliance," "Syracuse" and "Bremen" radiators have been on the market for so many years that a description of their merits is hardly necessary. They are known to practically all the trade and large contractors, and are now in use in all parts of the civilized world.

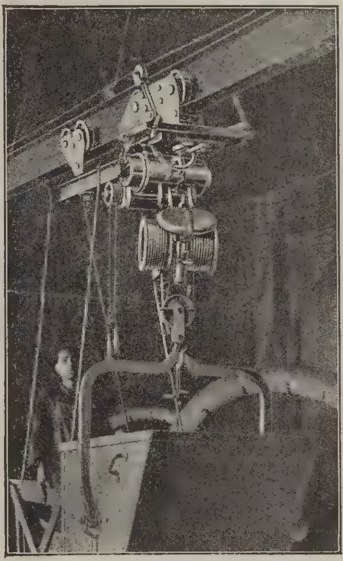
ELECTRIC POWER HOISTS.

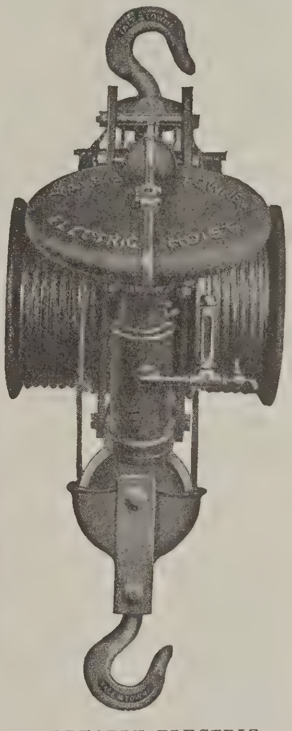
The use of electricity in the place of hand power is gradually revolutionizing hoisting methods in the more advanced industrial countries. In the United States and Germany especially the hoisting of comparatively small loads by electricity is becoming a common feature of up-to-date machine shop practice.

Electric hoists are undoubtedly the most convenient and economical type of hoist. For industrial work they are made in two styles, viz.: those that are permanently installed and those that are portable. The former find their usefulness principally on traveling cranes in steel works, foundries, etc., while the portable hoists are in this respect similar to a chain pulley block, and may be used wherever current is obtainable.

The portable hoist may be suspended from any overhead support, installed on traveling or jib cranes, or on overhead trolley systems. Where the hoist swings on a single upper hook it has a great deal of flexibility, and will readily operate at a considerable angle from a vertical lift. There is, however, no distinct line of demarcation between the portable and permanently installed hoist, since the former may be built into a crane or trolley, thus losing its portability and becoming a permanently installed hoist.

One of the newest and best types of portable electric hoists is made by the Yale & Towne Manufacturing Company, of New York. The hoists of this company are furnished in capacities ranging from one to thirty tons, and are operated by direct or continuous current at voltages from 110 to 650. The variable speed control, which is an important feature of the Yale & Towne hoist, permits the accurate handling of the most delicate lifting. Any man of ordinary intelligence can operate it.


ELECTRIC HOIST ON MOTOR DRIVEN TROLLEY.


PORTABLE ELECTRIC HOIST.

Installed on a motor-driven trolley or on an overhead I-beam trolley system, a hoist of this kind constitutes the most economical arrangement for handling most kinds of materials, in cases where the tonnage is not sufficient to make belt conveyors and other similar installations available. It is also found to be very efficient on old hand-power traveling cranes, since it can be installed at a fraction of the cost of a regular electric crane.

The exports of American made candles during the year 1906 represented a value of almost $600,000.

The exports last year of upper leather, including glazed kid, patent and enameled leather, etc., amounted in value to nearly $25,000,000.

MANUFACTURERS' NOTES.

"Consolidation Type Freight Locomotives," a pamphlet just published by the American Locomotive Company, New York City, describes and illustrates a large number of consolidation locomotives built for various railroads. This pamphlet includes only consolidation locomotives weighing less than 175,000 pounds, and will be followed shortly by a booklet illustrating designs of this type weighing more than 175,000 pounds.

The pamphlet opens with a description of the 2-8-0 type, giving its distinguishing characteristics and its special advantages for heavy freight service or service on light rails where the wheel load is limited. Then follow four pages of tables giving the principal dimensions of thirty consolidation locomotives ranging in weight from 66,000 to 175,000 pounds, the tables being arranged in the order of the total weights of the locomotives. The next two pages show drawings of the side elevation and end elevation of a typical design of consolidation locomotive. The rest of the pamphlet is taken up with photographic reproductions of the locomotives given in the tables, with the tabular information concerning the design on the page opposite each photograph.

This is the third of the series of pamphlets to be issued by this company, which will include all the standard types of locomotives, and constitute a record of the production of the company. Copies of the pamphlets already issued, on the Atlantic, Pacific and Consolidation types, may be had upon request.

The Benbow-Brammer Manufacturing Company, of St. Louis, Mo., which has become so well and favorably known throughout the country for the excellence of its washing machines, announces that the exclusive right for the manufacture and sale of its entire line of machines has been given to the H. F. Brammer Manufacturing Company, of Davenport, Ia., who will continue the manufacture of these products on the same extensive scale that has always characterized their development. The latter manufacturers are also widely known, being large producers of washing machines and all classes of furniture, and they enjoy an enviable reputation for the excellence and superiority of their products.

Owing to the rapid increase in both its domestic and foreign trade, the Ideal Concrete Machinery Company, of South Bend, Ind., has found it necessary to vacate its present factory building and has leased the plant formerly occupied by the Bissell Plow Company. This will give the company three times its present floor space, and will greatly increase its facilities for handling its large line of concrete machines.

The firm of John F. Allen, Nos. 370-372 Gerard avenue, New York City, recently received an order from the American Car and Foundry Company for six Allen compression lever riveters, to be used in their new plant in St. Louis, Mo. This is part of an equipment of fifteen riveters for the same plant, the balance of which will be ready for shipment by the first of January.

A new device for making a tight roof, and one which is proving very practical, has recently been placed on the market. It consists of a square, rust-proof cap made of sheet steel. The ordinary cap furnished with ready roofing is generally made of tin scrap, which has a tendency to rust in a short time. The new cap is not only rust-proof, but is said to be much stronger and to have more binding surface than the ordinary round cap, owing to its square construction. The patent on this device has been granted to F. W. Bird & Son, East Walpole, Mass., the makers of the Paroid roofing.

The Humphryes Manufacturing Company, with headquarters at Mansfield, Ohio, announces that it has moved its New York branch to 636-638 West Thirty-fourth street, where a large new office, salesroom and warehouse have been opened. This change was made in order to obtain increased facilities and enable the company to handle its domestic and export business in a more satisfactory manner than ever before. In the new warehouse a large stock is carried, consisting of pumps, both hand and power, sanitary enameled ware, including bath tubs, lavatories, sinks, etc., and a complete line of plumbers' brass goods.

As has been its custom for several years, the Harrington & Richardson Arms Company, Worcester, Mass., is again distributing a handsome calendar among its patrons and friends. The subject of the calendar is "The Canadian Trapper," and it is an artistically wrought piece of work, being a lithograph in ten colors, and measuring in size 14x26¾ inches. Any of our readers may obtain a copy of this calendar by addressing a postal card to the above company and mentioning the AMERICAN EXPORTER.

The Cement Machinery Company, Jackson, Mich., has made arrangements with Messrs. A. M. Lawrence & Co., whereby the latter become export representatives in New York city for the company's complete line of concrete machinery. The opening of this export office will greatly facilitate the handling of foreign business and enable the company to take care of that trade in an even better manner than ever before.

All foreign orders and inquiries will come through the New York office, and should be addressed to A. M. Lawrence & Co., No. 29 Broadway.

The South Bend Machine Manufacturing Company, South Bend, Ind., has recently issued a neat catalogue descriptive of its cement brick machines and concrete mixers, and it also contains information of much value to all users of cement. It is well illustrated and clearly brings out the many improved features for which these machines have become so well known and widely adopted. A copy of this catalogue will be mailed to anyone upon request.

Among the official delegates to the National Convention for the Extension of the Foreign Commerce of the United States held at Washington, few have taken a more active part in contributing to the upbuilding of American export trade than Mr. W. J. Clark, foreign manager of the General Electric Company, whose portrait we publish in this issue. Mr. Clark was one of the Governor's delegates from the State of New York.

WILLIAM J. CLARK, FOREIGN MANAGER GENERAL ELECTRIC COMPANY.

The presence in Washington of such practical men as Mr. Clark was a further instance of the importance attributed by manufacturers in general to the discussion of questions affecting foreign trade. The General Electric Company has been one of the pioneers in the introduction of American manufactures abroad. The broad and liberal policy of the company, and careful study of the conditions made possible by the great organization it maintains, have enabled the General Electric Company not only to meet the competition of European rivals, but to establish for its product a reputation second to no other in the world.

A new company, known as the E. A. Pflueger Company, has just been organized at Akron, Ohio, for the purpose of engaging in the manufacture of fishing tackle and general sporting goods. It is purposed by its projectors to make it one of the largest manufacturing plants of the kind in the country. The company is incorporated with a capital stock of $100,000. The incorporators are all men well known in the business world, and the president and general manager of the company is a man of exceptional ability and wide experience in this line of business. The prospects for the successful outcome of the venture are very promising, as both in ability and financial worth the men at the head of the enterprise are well equipped to carry it through to success. Operations will commence as soon as a factory can be obtained, and if this cannot be procured a large plant will be erected, and all the latest machinery for the manufacturing of fishing tackle will be installed.

The firm of Sittman & Pitt, New York City, has recently been reorganized, and in future the business will be conducted under the style of Pitt & Lienhardt. The firm will continue to manufacture the "S. & P." check protectors, pinking machines and marine motors, and the same high standard of excellence which has always characterized these products will be maintained. The address of the concern remains the same as formerly —212-214th streets and Harlem River, New York.

At the Cement Users' Convention recently held in Chicago, Ill., an exhibit which attracted unusual attention was that of the Century Cement Machine Company, of Rochester, N. Y., manufacturers of the well-known Hercules concrete block machine. Over one hundred blocks of different sizes and designs, all made on the Hercules machine, were built into two walls—front and back of the allotted space. The exhibition also showed many designs of copying and ornamental work. Extraordinary interest was created when the operators, in record breaking time, produced two blocks of different size and design on the one machine at the same time.

The "Hercules" is a face down machine. Tamping is done directly on the face, thus insuring a clear, sharp impression. The demand for these machines in this country is very large, and the company reports that its foreign trade is rapidly increasing, these machines now being in operation in nearly every civilized country in the world.

One of the largest whip producing centers in the United States is Binghamton, N. Y. For twenty-four years the Binghamton Whip Company, of that city, has been engaged in the manufacture of these products exclusively, and its line includes whips for meeting every possible demand in either material or style. There is practically no country in the universe where the Binghamton whips are not known, and they bear the reputation of being unexcelled in style, quality and durability.

The Dominion Cartridge Company has enlarged its ammunition plant near Lachute, and is adding much new machinery, with a view to taking care of its constantly increasing business, which during the past few years has grown beyond all expectation, 1906 having witnessed an increase of over 60 per cent.

The Syracuse Smelting Works, New York city, importers and dealers in new metal and manufacturers of all kinds of white metal alloys, announce that they have recently received a requisition from the Mexican Light & Power Company, Ltd., for 1,000 kilos of anti-friction babbitt metal, and they would like to arrange with some responsible concerns in Mexico, as well as South and Central America, to handle their products.

EXPORT NOTES.

For any additional information, names of importers, etc., write AMERICAN EXPORTER.

AMERICAN AGRICULTURAL IMPLEMENTS IN ASIA MINOR.

Consul Evan E. Young reports that an interesting test of the value of the American drill for sowing wheat as compared with the old broadcast method so common in Asiatic Turkey took place this past summer near Harput.

A small plat of ground was measured and then divided into halves. One part was placed under the supervision of Mr. Ajemian, agent for American agricultural machinery, while the other half was allotted to a native farmer. The former prepared his ground by a thorough plowing with an American plow, and the latter contented himself with scratching around on the surface with the historical crooked stick pulled by bullocks. Mr. Ajemian drilled in 2 eulcheks (1 eulchek = 10.61 pounds wheat, average) of wheat, while the native scattered 6 eulcheks broadcast on his half.

The harvesting of the wheat told the following story: From the 2 eulcheks drilled in with the American machine 50 eulcheks were harvested, but the native farmer from his 6 eulcheks of seed secured in return only 48 eulcheks. This object lesson has done more than catalogues without number to convince these people of the practical use and value of modern farming machinery. The fact that the use of reliable agricultural implements means more dollars and cents in their pockets has awakened a lively interest in this class of goods.

FIREARMS IN TURKEY.

In Smyrna a large trade is done in sporting guns. Shooting licenses cost but a few cents. In the surrounding country game is abundant. There being few or no preserves, even the very poorest go hunting. At present the trade is practically controlled by Belgium, which supplies a cheap fowling piece of rather heavy make but very durable. The guns chiefly sold are central fire breech-loaders, and usually have one barrel cylinder and the other choke bored, and are of either .12, .20 or .28 calibre. The prices range from $12 and upward. Single-barreled guns of small bore are occasionally sold for ladies' use. Larger bores than .12 calibre are not imported.

A few guns of English make are imported, and, although their quality is much superior to the Belgian article, their cost limits their sale to only the more wealthy classes. As the importation of rifled arms is strictly prohibited, the Ottoman custom houses will only permit the usual double or single barreled guns to pass, and for this reason repeating shotguns of the Winchester and other types, which are only allowed to be imported after being submitted to the ordnance department of the Ministry of War in Constantinople, where they are examined to see that they are not rifled, are not imported. There is also a considerable trade done in cheap muzzle-loading guns, costing from $7 upward. These are chiefly used by peasants living too far from town to obtain cartridges. No guns are made locally, although in Armenia a considerable quantity are made by local gunsmiths for use there.

IMPORTS OF ROUMANIA.

A report from Consul General Richard Guenther, of Frankfort, states that among the articles imported by Roumania in the year 1905 the following may offer some interest to American manufacturers and exporters. The appended figures give values in francs, a franc being equal to 19.3 cents:

Chemical products, dyes and ultramarine, 3,679,000; fine leather, 3,139,000; rubber shoes, 2,776,000; rubber goods, 1,190,000; woolen yarns and textiles, 23,223,000; cotton yarns and textiles, 35,069,000; cotton passementerie goods (trimmings), 1,635,000; cotton lace, 2,006,000; jute bags, 3,402,000; silk and silk mixed textiles, 7,017,000; ready made clothing, 4,233,000; bristol board, 1,965,000; gold leaf, 1,004,000; cheap jewelry, 1,345,000; iron and steel ware, tubing, plates, tools, etc., 19,802,000; tin plate, 1,578,000; steam engines and parts thereof, 11,505,000; agricultural machines, 11,855,000; other machinery and parts thereof, 5,723,000; small ware and cutlery, 1,402,000; railroad baggage and freight cars, 2,928,000. This shows that Roumania might be worth the attention of the manufacturers of the United States.

NEW DIAMOND MINES IN AFRICA.

The *British and South African Export Gazette,* published in London, asserts that remarkable discoveries of diamonds near Kimberley have recently taken place. This publication says: "We are happily in possession of certain facts which go to show that the discoveries in question are probably more momentous to South Africa's future prosperity than anything which that marvelous country has produced since the fabulously rich Witwatersrand gold field was first opened up. Some authorities even go so far as to assert that these discoveries transcend in area and richness the existing mines of the De Beers Company or that of the Premier Diamond Company, but without indorsing this statement it is unquestionably a fact that the Cape Colony has in them a potential source of wealth the importance of which would be difficult to overestimate. These diggings are alluvial and promise a market for mining implements, 'dollying' apparatus, etc."

OPENING FOR BUILDING MATERIAL IN CHILE.

Consul Alfred A. Winslow reports that there will be a large demand for builders' hardware, cement, lumber, structural iron or steel, etc., in Valparaiso, Chile, for the next two or three years, and believes it will pay the American producer to study the field.

The United States ought to have a large amount of this business, and at good figures. German and English houses are after the business hard, but now is the time to get a foothold that will last. The visit of Secretary of State Elihu Root to this Republic has had a good effect, and has had a tendency to draw the Chileans nearer to us. The demand will be especially strong for structural steel and corrugated iron, nearly all of which has hitherto come from Germany and England. More corrugated iron will be used now than ever, for it is proposed to use it not only for roofs but extensively for sheeting or siding for buildings.

CONSTRUCTION OF A STEEL BRIDGE ACROSS THE YALU.

It is reported in the local Japanese press that plans have already been completed for the construction of a large steel bridge across the Yalu River, between Antung and New Wiju, and that the work will be commenced some time during the coming April. The length of the bridge will be 3,239 feet, and the cost of construction more than $1,000,000. Until the doubling of the Seoul-Wiju and Antung-Mukden lines it is proposed to use only one side of the bridge for railway purposes, the other side to be converted into a public thoroughfare. Large piers will be erected at intervals of from 200 to 300 feet, and their height, about 40 feet, will be such as to avoid any obstruction of river traffic.

ELECTRICAL MANUFACTURE OF STEEL.

Consul Urbain J. Ledoux reports from Prague that Austrian papers are discussing the introduction of the Kjellin process in the manufacture of steel by the Poldihütte, at Kladno, Bohemia, in concert with the Oberschlesische Eisenindustrie-Gesellschaft, which process, says the Prague *Tagblatt,* may bring about a complete revolution in the Austrian steel industry. Continuing, the Prague *Tagblatt* says:

"That such steps may be leading to vastly important results may easily be realized when it is considered that the Kjellin process yields an excellent steel, said to be fully equal to the best crucible steel, while the cost of production is considerably lower than with the mode of production so far in use. The Kjellin product, however, apart from its lower cost, is further praised for its ductility, density, homogeneousness, softness, the possibility of obtaining high degrees of carboniferous quality, and, finally, for its excellent magnetic properties. If these surmises—as appears highly probable—should be proved by facts, all undertakings which have at their disposition the primary requisite for the adaptation of the electric process, viz., cheap electric power by means of sufficiently strong water power, will secure a great advantage over other works. Chief Engineer V. Engelhardt, in his work on the Kjellin process, states that it can compete with the Siemens-Martin method, where the kilowatt hour can be put down at about a half cent."

JAPANESE TURTLE FARMS.

A writer in the *National Geographic Magazine* says: "The place occupied among gastronomical delicacies by the diamondback terrapin in America and by the green turtle in England is taken by the 'suppon,' or the snapping turtle, in Japan. The three are equally esteemed and equally high priced, but the Japanese epicure has this advantage over his brothers of other lands—he has no longer any fear of having the supply of the luscious reptile exhausted. This desirable condition is owing to the successful efforts of a Mr. Hattori, who has spared no pains to bring his turtle farms to a high pitch of perfection, and is able to turn out tens of thousands of these reptiles every year.

"In general appearance a turtle farm is at a first glance nothing but a number of rectangular ponds, large and small, the large ones having a size of 15,000 to 20,000 square feet. One or more of the ponds are always reserved for large breeding turtles or 'parents,' as they are called.

"In Hattori's farm a person goes around the 'parents' pond' once a day or so and covers up with wire baskets all the new deposits made since the last visit. Each basket may be marked with the date if necessary. This covering serves a two-fold purpose—the obvious one of marking the place, and in addition that of keeping other females from digging in the same spot.

"The hatching of the egg takes, on an average, sixty days. The time may be considerably shortened or lengthened, according to whether the summer is hot and the sun pours down its strong rays day after day, or whether there is much rain and the heat not great. It may become less than forty days or more than eighty days.

"The young just hatched are put in a pond or ponds by themselves and given finely chopped meat of a fish like the pilchard. This is continued through September. In October the snapping turtle ceases to take food, and finally burrows into the muddy bottom of the pond to hibernate, coming out only in April or May.

"From the third to the fifth year, inclusive, the young need not be kept in ponds strictly according to age, but may be more or less mixed, if necessary. The young of these years are also the best and most delicate for eating, and are the ones most sold in the market. In the sixth year they reach maturity and may begin to deposit eggs, although not fully vigorous till two or three years later. How old these snapping turtles live to be is not known."

BOOK REVIEW.

EXPORTERS' ENCYCLOPÆDIA.

(One Volume. Exporters' Encylcopædia Company, New York City.)

The Exporters' Encyclopædia Company, New York City, has recently issued the third edition of its 1907 encyclopædia, and the value and importance of this splendid work can hardly be overestimated. While primarily of value to shippers in the United States, it is not lacking in interest to buyers and shippers in foreign countries.

The task of selecting and compiling the material for this work has been skillfully performed by the authors. The book contains full and authentic information relative to shipments for every country in the world, and it is safe to state that no more complete export shipping guide has ever been offered to American exporters.

As a reference book it is of most appreciable value, as every point bearing on the shipment of goods to foreign countries has been given the most careful consideration, and is explained with accuracy and clearness.

The first section of the work is devoted to general shipping instructions, in which the authors touch on shipping permits, delivery of goods, bonded goods, receipts, dock fire risk, marine insurance, consignment of goods, packing, bills of lading, foreign duties, freight rates, consular documents, protection of trademarks in foreign countries and many other important things which it is necessary that the exporter should know.

Then in alphabetical order each country is taken separately, and the shipping routes, rules and regulations that apply to shipments over all lines are given in detail. In addition to this, the length of time it takes to go from New York and all other "outports" of the United States to foreign countries is accurately stated, and a list furnished of cable rates from New York to all countries in the world.

The subject of packing goods for export shipment, one of the most important to both the shipper and the buyer, has come in for its full share of attention. As is well known, foreigners complain frequently of the insecurity of American packing as compared with that of European countries. Shipments for export are necessarily subjected to frequent and rough handling, and when improperly packed are liable to arrive at their destination in bad condition. The loss or damage usually falls upon the consignee or upon the shipper, as the steamship company may disclaim responsibility under the clause "not responsible for breakage," which is to be found in all bills of lading, and may claim that goods were not in shipping condition when received by them. Brief but valuable suggestions are given in the encyclopædia as to the proper methods for the shipper to adopt in packing his goods in order to insure their safe delivery to destination. A list is also furnished of the articles that may be sent by parcels post, together with a table showing the various countries to which the "parcels post" extends.

Nothing is omitted from the volume that will aid the exporter in becoming thoroughly familiar with the proper method of getting his shipments to foreign lands. The approximate value of foreign coins is shown, also tables of foreign weights and measures, with American equivalents, and all commercial terms are clearly explained.

Other sections of the book are devoted to consular regulations, both here and abroad, and the names are given of all the foreign consuls in the United States and the American consuls located in foreign cities.

This encyclopædia is a book that American shippers can ill afford to be without, as it solves practically every problem that confronts the exporter when shipping his products to foreign countries.

THE MAKER OF MODERN MEXICO, PORFIRIO DIAZ.

(One Volume. By Mrs. Alec Tweedie.)

Interesting and valuable from many points of view is the book lately put out by Mrs. Alec Tweedie, entitled "The Maker of Modern Mexico, Porfirio Diaz." It is a splendidly executed work, written in a pleasing and fascinating style, and it is safe to venture the opinion that no more authoritative history of Mexico has ever appeared. It is written partly in the nature of a biography of the country's present ruler, whom the author regards as "the greatest man of the nineteenth century."

Mrs. Tweedie enjoyed the privilege of being a close personal friend of President Diaz's family, and she had abundant opportunity to procure the mass of authentic information and beautiful illustrations of which the volume is comprised. Particular interest is attached to the account of the attempt to seat an Austrian archduke on a Mexican throne, the details of the overtures made by Maximilian, and the interview with Marshal Bazaine, all of which has been reproduced from pages of General Diaz's diary. With much understanding and clearness the author has related the subsequent history of the ruler of Mexico, and the wonderful benefits which have resulted from his government.

All the documentary information concerning the progress of the country and the career of its President were furnished by President Diaz himself, and the story of his career, from a position of obscurity to one of power, is portrayed as symbolic of the country's advancement.

From personal intercourse and observation the author has been able to tell of many charming incidents in the daily life of the President and his family, and these she has narrated in a delightful and most interesting manner. The volume is profusely illustrated, containing among others an autograph picture of President Diaz as he appeared at the age of seventy-four.

The book as a whole is one that may be read with interest and profit by all, but to the close student of Mexican affairs it is a work of more than ordinary value and importance.

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OUR AUTOMOBILE EXPORTS.

Keeping pace with the wonderful growth of the automobile industry, the exports of American motor cars are steadily and rapidly increasing. Three years ago, in 1904, the value of our total automobile exports was $1,897,510; in the following year, 1905, the value was $2,695,655, while during 1906 American automobiles shipped abroad represented a value of $4,409,186.

Our largest customer in 1906 was the United Kingdom, to which country we exported no less than $1,138,264 worth of automobiles. Our second largest buyer was British North America, with $878,885, followed by Mexico with $717,523.

That American cars are also held in high esteem by France is demonstrated by the fact that during the year the French Republic took $336,273 worth of them. The next largest buyers, in order of importance, were Italy, West Indies, Australasia, Germany, South America, the Far East and South Africa.

In England the automobile industry is so flourishing that most of the factories are either planning or actively carrying out extensions. The British automobile industry now represents some $30,000,000 capital, and employs about 20,000 hands. The present demand is unprecedented; so great, indeed, that the home factories cannot cope with it, but are forced to supplement their output by importing foreign cars and parts thereof. During the year 1906 the United Kingdom imported over 4,000 foreign automobiles, which shows the extraordinary demand for this kind of vehicle. Similar conditions prevail on the Continent; Germany, Italy, France, Holland, Scandinavia, Spain, Austria, Belgium, in fact, most of the European countries, are importing foreign automobiles in steadily increasing quantities, and it is said on good authority that this demand will continue to increase from year to year.

The automobile is also making considerable headway in South America; while in former years chiefly French and German cars were imported, American automobiles can now be seen in all the leading cities of Brazil, Argentina, Uruguay, Chile and Peru.

Even far off India is rapidly taking a leading place in the exploitation of the motor car. It is worthy of the careful attention and thorough investigation of American manufacturers who are seeking to enlarge their markets. According to late statistics, the imports of motor cars, motor cycles and cycles during the last fiscal year aggregated in value $2,000,000, of which one-half passed through the port of Bombay, the supply mart of Western

India. The high class and high priced cars, which in any country must be considered as luxuries, have found their best customers among the native Indian rulers, whose example has been followed by rich Parsee merchants and financiers of Bombay and Calcutta.

Other markets well worth our close attention are Singapore, the Straits Settlements, the Federate Malay States, the Islands of Sumatra, Java and Borneo. In these countries the motor car trade is yet in its infancy. In Singapore there are about 60 passenger and some 20 freight cars, and the demand is steadily increasing.

The circumstance that last year 48 per cent. of our automobile exports went to Europe demonstrates better than anything else that the reputation of the American made automobile has been established.

It has been a matter of much surprise in the sections of Europe frequented by American tourists the past season to see the wonderful progress made by the manufacturers of American automobiles and to note the large number of cars brought to foreign countries from America by Americans touring abroad. In some cases these machines were so nearly the counterpart of the foreign cars as to make it difficult to distinguish between them. As a matter of fact, it is now generally known that there are cars being made in this country which are on a par with the best cars made in France, Germany and Italy, and it is not surprising to learn that owners of late models of these best American cars, in comparing them with machines of foreign manufacture which they have owned, state that the cost for up-keep is in favor of the American made machine, for the latter, considering the much more rigorous work which an automobile is called upon to do in the conditions met with on American roads, must of necessity call for greater strength and possibilities of endurance. The reason, therefore, why Americans have not been more active in seeking foreign trade is not far to seek, for even up to the present time manufacturers of high grade American cars find it difficult to supply the demand of the home market. The enlargement of factories and increasing of facilities, however, would indicate that within the next twelve months it will be necessary to seek for foreign markets, and already the press of the foreign trade are sounding warning notes to their builders to look well to the home trade, for the American manufacturer has proven by recent models, and at the last exhibitions, that the American cars will prove strong competitors in any market.

Everything points to the probability that the demand for motor cars will largely increase during the present year; the shows held in this country and abroad are attracting livelier interest and attention than in any previous year, and it is to be hoped that the manufacturers of this country will take full advantage of the opportunities that await them to extend their trade in foreign fields.

No market should be overlooked. The reputation of the American automobile is an established fact.

TRADE OF THE UNITED STATES WITH PANAMA.

Exports from the United States to Panama now average more than one million dollars a month, and our total trade with that Republic seems likely to aggregate 16 million dollars in the fiscal year which ends with the month of June. Bananas, india rubber, hides and skins, vegetable ivory, and mahogany are the principal articles imported from Panama, and their value in the year will aggregate about 2 million dollars. Meats, lard, flour, bread and biscuit, fish, butter, cheese, cotton cloths and clothing, vegetable and mineral oils, tobacco, wines, spirits, liquors, timber, lumber, and manufactures of iron and steel of various sorts are the principal articles exported to Panama. The exports to that Republic now constantly exceed one million dollars per month, and in the full year will probably exceed 14 million dollars.

Both the imports from Panama and the exports to that Republic show a marked increase in 1907 compared with 1906. The figures of the Bureau of Statistics of the Department of Commerce and Labor, just compiled, show the details of our trade with Panama during the seven months ending with January, 1907, this seven-month period being that part of the fiscal year ending with June, 1907, for which figures are now available. These figures, which will hereafter be published in detail in the Monthly Summary of Commerce and Finance, show the movements of hundreds of articles from the United States to Panama for the latest available month, and compare the figures of that month with the corresponding month of the preceding year; also for the accumulated months of the year, compared with corresponding months of the immediately preceding year.

These figures of the trade with Panama in the month of January, 1907, and the seven months ending with January, 1907, indicate a rapid growth in both our imports from Panama and in our exports to that country. Bananas are the largest single item of the practically one million dollars' worth of merchandise imported therefrom in the seven months ending with January, 1907 the value of bananas alone being $471,870, against $338,217 in the corresponding months of the preceding year. India rubber, of which the United States is steadily increasing her importations and consumption, amounted to $91,720, against $55,028 in the corresponding months of the preceding year. Of vegetable ivory the imports from Panama were nearly 2 million pounds in the seven months, against a little over half a million pounds in the same months of last year. Of hides, the figures were nearly a half million pounds, against less than 300,000 pounds in the corresponding months of the preceding year, and of coffee 178,000 pounds, against but 25,000 pounds in the same months of last year.

The articles forming the more than one million dollars' worth of merchandise exported to Panama each month are not, as might be supposed, exclusively, or in a large proportion, for direct use in canal construction, as is evidenced by the fact that cotton cloth, flour, bread and biscuit, eggs, fish, fruits, furniture, manufactures of india rubber, boots and shoes; canned, salted and fresh beef; bacon, hams, pork and lard; oleomargarine; butter, cheese and milk; cottonseed oil; mineral oil for lighting; wines, distilled spirits and malt liquors; refined sugar, vegetables, soap and tobacco are included in the statement of articles exported to Panama, and show a marked increase in 1907 over 1906. Manufactures of iron and steel are, however, a considerable item in the exports to Panama and presumably a large part of those are for use in canal work. For the seven months ending with January, 1907, iron and steel manufactures sent to Panama aggregated a little over 2 million dollars, against a little less than 2 millions in the same months of the preceding year.

The fact, however, that meat and dairy products aggregated three-quarters of a million dollars; boots and shoes, nearly $200,000; lard, over a quarter of a million, and breadstuffs, over a quarter of a million, shows that the exports to Panama are not by any means exclusively for the canal or for the use of the Government in building it, but that a large proportion is for individual and personal consumption by persons residing in Panama. How much of this large purchase of products of the United States is made by or for that element of the population engaged in canal construction or canal work of any kind cannot, of course, be accurately estimated; but at least the figures of the Bureau of Statistics show clearly that only a comparatively small proportion of the merchandise now being sent to Panama is for direct use in canal construction.

SHARE OF THE LEATHER INDUSTRY IN THE FOREIGN COMMERCE OF 1906.

The leather industry contributed 150 million dollars to the foreign commerce of the United States in the year 1906, against less than 55 millions a decade earlier. These figures, supplied by the Bureau of Statistics of the Department of Commerce and Labor, combine imports and exports of leather and its manufactures and imports and exports of hides and skins. In all of these, especially in imports of hides and skins and exports of leather and manufactures from that article, the growth of the decade has been extremely rapid. Hides and skins form the largest single item in the record of imports, and leather and manufactures thereof stand third in the list of manufactures exported.

The industry of bringing in from abroad the raw material for the manufacture of leather and sending out of the country the finished article, whether leather or manufactures therefrom, has shown a remarkable growth during the decade. The value of hides and skins imported in the calendar year 1906 was practically 84 million dollars, and in 1896, a decade earlier, was but 21 millions, having thus quadrupled in 10 years. Of leather and its manufactures exported, the figures for 1906 were over 45 million dollars, and in 1896 were less than 19 millions. Add to this 84 millions of hides and skins imported and 45 millions of leather and manufactures thereof exported, the 18 million dollars' worth of leather and manufactures thereof imported and the nearly 2 million dollars' worth of hides and skins exported, and the grand total which leather and the materials for its manufacture form in the foreign trade of the United States aggregates in the calendar year 1906 about 150 million dollars.

All sections of the world bought of our boots and shoes and other manufactures of leather in 1906, and nearly all sections sent their raw hides and skins in exchange therefor. Of boots and shoes alone the United Kingdom took in that year nearly 2 million dollars' worth, against but a quarter million dollars' worth a decade ago. Belgium, France, Germany, the Netherlands, and other European countries also took greater or less values of boots and shoes, as well as other classes of leather. Canada took 1¼ million dollars' worth in 1906, against one-fourth of a million dollars' worth in 1896; the West Indies, exclusive of Porto Rico took 2⅓ million dollars' worth in 1906, against one-third of a million in 1896; Mexico, 1½ millions in 1906, against 51 thousand dollars' worth in 1896, while South America, Australia, various sections of Asia and Oceania, and British Africa were also in 1906 customers for boots and shoes of American manufacture.

In addition to the 9½ million dollars' worth of boots and shoes exported in the year 1906, there was 25 million dollars' worth of "upper" leather and 8 million dollars' worth of sole leather, all intended chiefly for boot and shoe making, while harness and saddles and other classes of leather manufactures added a couple of million dollars to the total and were distributed to all parts of the world. To the United Kingdom the exports of upper leather have grown from 7⅓ millions in 1896 to 13⅓ millions in 1906, while of sole leather the exports to the United Kingdom grew only a single million dollars in that time, having been 5⅓ million dollars in 1896, against 6½ millions in 1906.

India, China, Japan, Australia, Argentina, Brazil, Mexico and the Central American States contributed to the 84 million dollars' worth of hides and skins for use in the making of leather imported in 1906. Of hides of cattle, the largest contributor was Argentina, 5 million dollars' worth in the fiscal year 1906, while over 2 million dollars' worth was brought from India, more than 1 million dollars' worth from Mexico, 2⅓ million dollars' worth from Canada, and 2 million dollars' worth from France.

American machine tools, valued at $7,913,327, were exported last year. This is an increase of more than $2,000.000 over the previous year.

THE AUTOMOBILE INDUSTRY IN THE UNITED STATES.

By HENRY L. GEISSEL.

The growth of the automobile industry in the United States during the past ten years offers one of the most remarkable examples of the power of American capital and intelligence to found and build up a great business in a short space of time.

Statistics have recently been published by a well-known French authority on automobiles which show that, whereas six years ago the United States manufactured practically no automobiles, today she builds a larger number than even France, and this in spite of the fact that no country in the world has paid less attention than the United States to the construction and maintenance of country highways.

In 1906 the number of automobiles manufactured in the United States is given at 60,000, as against 55,000 in France, 28,000 in England, 22,000 in Germany, 19,000 in Italy and 12,000 in Belgium.

These figures, in the case of the United States, include, of course, a large proportion of small cars or runabouts, which have proved popular for city use. The demand for small vehicles in European countries has not been so great, the excellent system of public chaussées stretching northward from Spain to Scandinavia and from the English Channel to the boundaries of Russia making touring and high power cars more desirable to the average purchaser.

The rapid strides made in the expansion of automobile manufacture in this country have unquestionably been largely due to the ingenuity of machine tool builders, and in this respect European builders owe much of their progress to the United States. Modern automatic machines, such as screw machines, turret lathes, grinding machines, milling machines, gear cutting machines, drill presses, shaping machines and boring mills have wrought wonders in automobile shops, both at home and abroad.

An instance of the effect of up-to-date American machinery in a foreign country was made apparent some three years ago when the factory of the Daimler Motoren Actien Gesellschaft at Canstatt, Germany, was burned. The production of the Daimler factory before the fire was approximately 200 machines per annum. The erection of a new plant was immediately begun in Unter-Türkheim, near Stuttgart, and the contracts for the installation of American machine tools have since amounted to more than $500,000. The capacity of the new plant was raised to a yearly output of 800 cars. It now ranks high among the best equipped factories in the world.

In the French factories, such as Panhard, Bayard-Clément, Renault, etc., and in the Italian factories, the use of American machine tools is equally conspicuous, a very large percentage of the automatic machinery employed in turning out parts being imported from the United States. Improvements that increase the efficiency of machine tools are known to the car builders of Germany and France as soon as they are put upon the market in this country, and the latest types of machines find their way as quickly to the European shops as to those at home.

The superiority of American automatic machinery used in the construction of motor cars over European-built machine tools can be appreciated when it is remembered that the expense of shipping such machinery, together with the duty and the agent's selling expenses and profit, brings the cost to the user considerably higher than the selling price to the American manufacturer. In other words, the European car-builder, who is accustomed to pay the comparatively low prices for German or Belgian machines and tools, is obliged, in order to keep his capacity at the highest point, to buy high-priced American machines. The greater productive capacity of the American

machines, however, speedily counterbalances the difference in price.

The Italian automobile shops have in the past two or three years been large purchasers of American automatic machinery. The establishment of the industry in Italy is of more recent date than that of the other large Continental countries. Italian engineers have been frequent visitors to the United States and have gone home equipped with the latest knowledge of the methods employed here, the result being that they have placed extensive orders with the representatives of American houses abroad.

It is estimated that the value of automobiles manufactured in the United States in 1906 exceeded $100,000,000, as against $116,000,000 of horse-drawn vehicles. It is impossible to ascertain the proportion of pleasure cars in this amount, but it is safe to assume that a considerable percentage represents cars for commercial uses. Express companies are using automobiles for delivery purposes; department stores employ them to deliver parcels; breweries have adopted them for the distribution of supplies; the Government is experimenting with them in handling the mails; in short, the motor car has earned a place in the traffic of cities that is not only permanent but will grow as rapidly as the production can keep pace with the demand.

Three years ago the commercial wagon was practically unknown in this country. Prior to that time manufacturers had been concentrating their efforts on pleasure vehicles, the demand for which was sufficient to monopolize their entire time and energies. The few cars built for commercial houses were in many cases unsatisfactory, mainly for the reason that they were handled by inexperienced drivers, and were given little or no attention in the repair shop. These conditions have, however, greatly changed in the past few years. Business houses which own and operate cars now realize that the engine of a car requires careful attention, and the results are now uniformly good.

England has probably given closer study to the commercial car than France, Germany or the United States. As far back as 1897 and 1898 the problem to which English manufacturers sedulously applied themselves was to build cars that would solve the traffic question between towns in the thickly settled districts. That they have been eminently successful is evidenced by the already widespread and growing use of automobiles in every class of transportation.

In passenger transportation England may also be said to lead the world. Hundreds of motor vehicles are in use in the streets of London and giving satisfaction.

In Paris attempts have several times been made to supplant the clumsy horse-drawn omnibuses by motor buses, but the results have been disappointing. Recent experiments have given more hope that the project to do away with the bus horses will ultimately be successful.

In Berlin, a large number of roomy motor omnibuses have replaced the antiquated horse bus on the Friedrichstrasse, the principal business thoroughfare. It has been

AUTOMOBILING IN NEW SOUTH WALES.

found, however, that the cost of operating these motors is considerably in excess of the old system, notwithstanding the fact that solid tires are used and that the conditions of the street are entirely in favor of the motor.

The automobile cab in Berlin has proved a substantial success. The fares have not been increased and are exceedingly reasonable, while the speed of these vehicles is a boon to business men in traversing the city. Mayor McClellan, of New York, during his visit to Berlin last summer, characterized the motor cab system as the most up-to-date service in the world. In many German cities the leading hotels have also adopted the motor omnibus, while the electric cab system of Cologne is almost as well developed as in Berlin.

To leave Europe, the omnibus company of Sydney, in Australia, tried the experiment two years ago of a number of motor buses. The results were in the beginning not entirely satisfactory; partly for the reason that the streets of Sydney are exceedingly hilly and partly because sufficiently high-powered motors were not used. More encouraging results are now being obtained.

One of the leading Japanese cities is also carrying on experiments with motor omnibuses. A number of cars were recently sent to Kobe by an American manufacturer to be used for carrying passengers to and from the suburbs of Kobe. This service should prove popular owing to the hilly condition of the streets in the environs of Kobe, which makes the use of jinrickshas slow and tedious.

BUCKBOARD RUNABOUT.

It is, however, improbable that automobiles will gain a strong foothold in Japanese cities for some time to come. The streets are narrow and constantly crowded with pedestrians and rickshas, prohibiting a rate of speed above a snail's pace. For use in the interior, however, between the cities of Yokohama and Tokyo, Kyoto and Osaka and Kobe and other more distant points of interest, motor cars will undoubtedly find favor with the growing attraction of Japan as an objective for tourists.

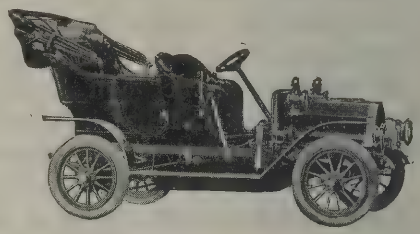
In Australia the use of motor cars as pleasure vehicles is growing as rapidly as elsewhere. This has been particularly noticeable during the exceptional prosperity of the last three years. Probably no people in the world are greater sportsmen than the Australians; certainly nowhere is horse-racing more closely followed than in that distant colony, and yet despite the difficulties of road-building consequent upon the great distances between the large cities one sees proportionally almost as many cars in Melbourne and Sydney as in the average American or European city.

LIGHT DELIVERY WAGON.

On the Continent and in England the manufacture of motor cycles has developed into an important industry. Here again the cause may be attributed to splendid highways. The motor cycle as built today in Germany, France or England is placed within the reach of almost every cyclist, and in Germany, Austria and Switzerland especially is much used for touring. As a tricycle, it is also employed to a large extent in German and Austrian cities as a cheap delivery car for small parcels. An Austrian firm, located in Graz, has made a specialty of these articles and has successfully invaded Germany with both its cycles and tricycles.

TWO-PASSENGER RUNABOUT.

In the United States motor tricycles for delivery purposes have not found as much favor as in European countries. A great many light delivery vans are, however, in use in the principal cities. One of our illustrations shows a delivery car made by the Waltham Manufacturing Company, Waltham, Mass. This car is designed to meet the requirements of business houses desiring a light car for quick delivery purchases. The capacity of the car is six hundred pounds, and, being fitted with friction transmission, it requires no especial mechanical ingenuity to operate it.



POPULAR TOURING CAR.

We show several other illustrations of cars made by the same company, embodying some of the newest features of the progress made by manufacturers in this country. The buckboard runabout is of the friction driven type; it is simple of operation, strong and well-built and is especially suitable for rough roads and hill climbing. In the New York efficiency test held May 5 of last year the two cars of this type which were entered in the contest broke all existing records, one car traveling 94 miles and the other 101.6; each on two gallons of gasoline, and neither car making a stop for repairs or adjustment.

Another buckboard type of machine made by this company is more pretentious in appearance and is designed particularly for the use of physicians and others requiring a stylish and serviceable runabout. It is equipped with wheel steering device. The four passenger Waltham car is regularly fitted with a two-cylinder motor and side entrance. The motor is of the "V" type, the cylinders are set at angles of 45 degrees and their dimensions are 3¼ x 4¼ inches. Both valves are mechanically operated by push rods and walking beams from a single cam.

Very long valve stems are used, the springs being mounted above the cages and away from the heat of the cylinders. The cylinders are cast with the radiating flanges integral, and the arrangement of the valves in the head, side by side, insures a cool running engine. The base casting, which contains the crank pits, is partitioned off by vertical walls at the limit of the case proper, the remaining space on either side being enclosed and used as an oil reservoir.

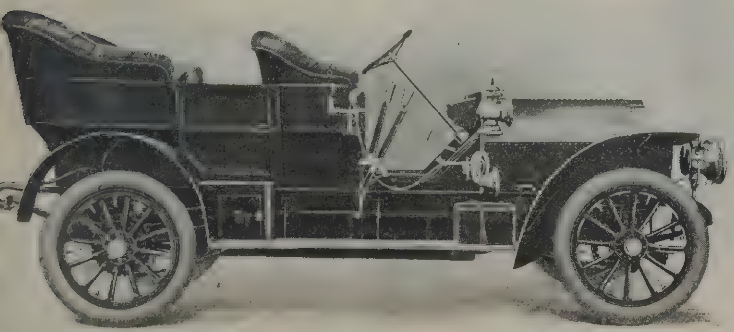
In the lubricating system, a short pipe line taken from one of the two connecting reservoirs leads through a ball check valve to a gear pump mounted on one of the half-time shafts, its rate of delivery being regulated by means of a thumb screw. The delivery leads directly to the base of the cylinder at a point on the crank case midway between them. A direct and constant feed from this point causes the oil to flow on to and down one of the crank webs, and into a brass cup secured to its face. A duct, drilled through the crank pin, permits the oil thus gathered to flow through the middle of the connecting rod bearing, where it is thrown by centrifugal force to the bearing proper and thence by overflow through drillings in the stub ends into the crank case.

The main bearings of the crank shaft are lubricated by the splash. The ignition timer, which is of the snap break order, is located on one of the half-time shafts. The carburetor is located upon the same casting.

We have made reference above to the increasing popularity of motor cars for business purposes.

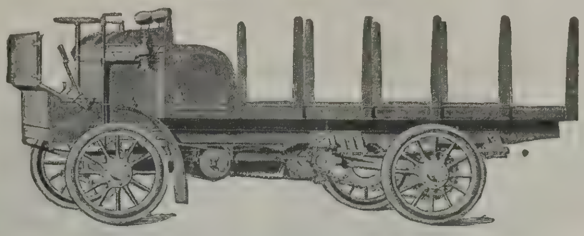
One of the largest manufacturing concerns in the country, the Knox Automobile Company, of Springfield, Mass., has recently been obliged to more than double the size of its factory in order to take care of the rapidly increasing demand for this class of automobiles. While by no means ignoring the pleasure vehicle trade, this company has devoted a goodly part of its attention to commercial cars, and is credited with being one of the oldest and largest manufacturers of cars for commercial purposes in the world.

The company's leading pleasure model for 1907 is known as the Model "H" Knox Waterless, and it is a car of 25-30 h. p. This is said to be one of the most up-to-date models on the American market, and combines the best of the foreign with the best of American practice. It has a 102-inch wheel base, 32 x 4 inch wheels, a three speed sliding gear selective type transmission, two powerful brakes, and is a typical example of a well-built and thoroughly modern car.



THIRTY-FIVE—FORTY HORSE POWER TOURING CAR.

As is evident from the name, no water is used in the cooling of these cars, the system of a forced draft projected upon grooved pins inserted in the cylinder walls taking care of this function perfectly. This system has been used by the company since it commenced building cars in 1899, and has continued for seven years in practically an unchanged form, a fact which argues much for its efficiency. The method varies from other air cooled cars, in that the cylinders are cast with the flanges, the grooved pins being entirely additional. The cylinder walls are first bored and then tapped to receive the threaded pins, which are inserted about one-eighth of an inch. This brings the internal heat to the surface, and with the forced draught from the fan dissipates it thoroughly, dispensing entirely with the usual radiator and plumbing incidental to the water cooled engine. The good points of this system were demonstrated in the recent Glidden Tour, in which the Knox Company entered its Model "G," said to be the largest air cooled car in the world. The car went through the contest without a penalty of any kind.

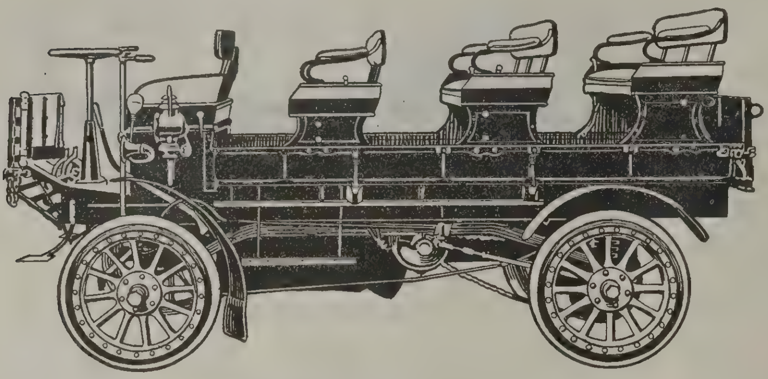


SIX THOUSAND POUND AUTO TRUCK.

The commercial cars manufactured by this company are of the simplest possible construction, comprising a two-cylinder horizontally opposed engine, with an automatic inlet valve and a mechanically actuated exhaust. This extreme simplicity was found necessary by reason of the class of labor available for operating them, and its value is demonstrated by the fact that there are few cities of any size in the United States that do not operate one or more of these cars for commercial purposes. Many models of this type of car are constructed, ranging from a capacity of 1,000 to 6,000 pounds.

Another 1907 line of cars which merits especial attention is that manufactured by the Wayne Automobile Company, Detroit, Mich. This concern, one of the pioneers in the field, has grown steadily until it now occupies a foremost position among the automobile manufacturers of the United States.

An important factor in the development of the concern has been its progressiveness in evolving new ideas and improvements designed to simplify the automobile and increase its efficiency. This is very clearly exemplified in the company's 1907 line of cars, which incorporate all the desirable and advantageous features that appeal to the discriminating automobilist. Noticeable among the strong points is that of placing the selective type sliding gear transmission on the rear axle, doing away with all intermediate mechanism, eliminating noise and vibration and insuring accurate alignment of parts at all times. The simplified construction materially reduces the number of wearing parts and has an important bearing on the question of maintenance.



SIGHTSEEING AUTOMOBILE.

For 1907 the Wayne Automobile Company is producing four models. These include a 50-horse power, seven-passenger touring car, with Pullman body; a 35-horse power, five-passenger touring car; a 30-35 horse power, five-passenger car, and a 30-35 horse power runabout. In addition to the popularity which these cars enjoy at home, they have met with pronounced favor in all foreign lands where they have been introduced. The company states that its export trade during the past year has shown a most gratifying increase, and it is anticipating a large foreign demand for its 1907 models.

The Rambler line of cars for 1907, made by Thos. B. Jeffery & Co., in Kenosha, Wis., comprises both two and four cylinder models, as in 1906. Of these, three models may particularly be mentioned. The largest is a five-passenger touring car with detachable tonneau; another, a runabout or, more properly speaking, a two-passenger touring car, built on the same chassis, with torpedo deck. The deck is removable and by substitution of a tonneau the car becomes similar to the first. The third is a runabout identical in design with the above but lighter and smaller. The three designs are known as Models 21, 22 and 27 respectively.

There has always been a demand for cars of the convertible type that could be used either as five-passenger cars or as a two-passenger car by the removal of the rear seat. Heretofore these have been readily distinguishable through the unpleasant lines of connection between the tonneau and the balance of the body. In the new Rambler model this objection is entirely eliminated and it shows no outward appearance of detachability. The connecting line is along the front of the door, covered by a molding, and along the floor of the tonneau. In fact, it is only upon minute examination that it can be seen that the body is not built as a solid unit. This is also true when used as a runabout, the rear portion of the body having none of that "hung on" appearance common to the earlier cars of this type.

The bodies of these cars are secured to the frame by means of combination lock hinges at each side. By releasing two knurled hand nuts at either side of the car the entire body may be swung to the other side and held in position by brace rods provided for the purpose. Thus is exposed the entire mechanism of the car. By loosening all hinges at both sides, the body may be lifted clear of the frame. This method of body attachment, in connection with the design of motor and power plant, gives the utmost degree of accessibility and that entirely from above. Both crank case and transmission gear housing are fitted with large, readily removable covers, thereby giving complete access to all bearings and adjustments.

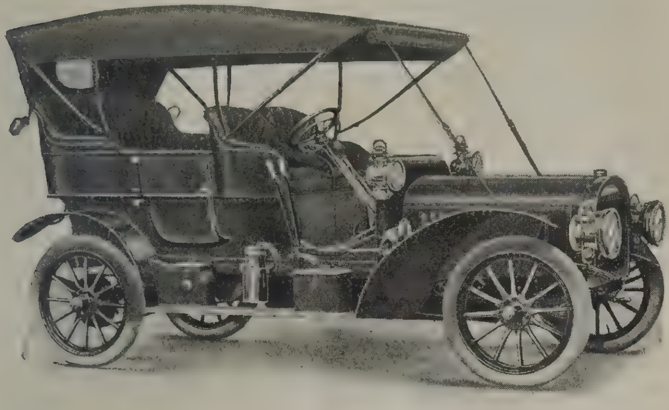
The chasses are absolutely identical, except in the smaller type. The first two models are equipped with a 5 x 6 motor giving 22 horse power, the third having a motor 4½ x 5 giving 16 horse power.

The three models of this type are fitted with the new Rambler unit power plant comprising a double opposed motor, planetary transmission and multiple disc clutch built integral with three-point support. The transmission gear provides two forward speeds and one reverse. Application of the forward speeds is by side lever and the reverse by pedal. Final drive is by single chain to the differential in the rear axle and on the high gear the entire transmission becomes a fixed unit and the drive is direct without the use of intervening gears.

The rear axle is the float type with enclosed differential and sprocket. The feature of this mechanism is that the entire load is carried on roller bearings intervening between the rear axle sleeve and wheel hubs, thereby relieving the rotating shaft of all but the driving strains.

FIVE PASSENGER TOURING CAR.

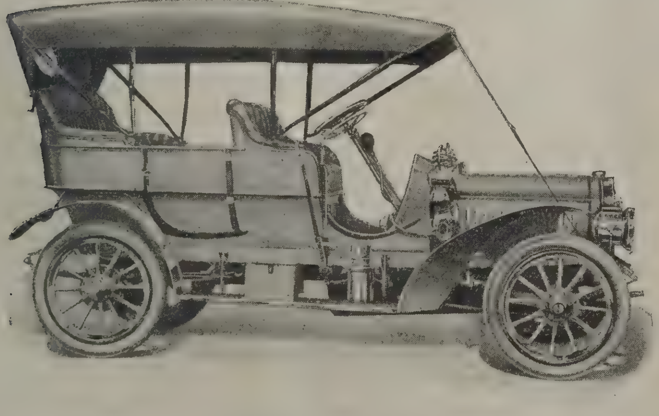
The motors are water cooled on the thermo-siphon system while the lubrication is by pressure feed oiler with sight feeds on the dash. Ignition is by jump spark, energy being furnished by 6-volt, 60-ampere storage battery. Two sets of brakes are provided on each model; primary of the band type on the transmission gear, the secondary expanding in the rear hubs.



TOURING CAR, MODEL 25.

Two models of the four-cylinder type are also shown in our illustrations. These are known as Models 24 and 25. The former embodies many new and novel features. The motor is accessible from the side, the crank case opening also at the side, a single plate giving access to the entire crank and cam shafts with all their bearings and adjustments. There is no sub-frame, the motor being suspended directly from the main frame; thus there is no interference by frame members and the motor is as convenient of access as though on a stand or bench.

The transmission gear is a new design of the sliding type and is built integral with the propeller shaft and housing, the only universal joint being a double one between motor and transmission gear. Large hand plates at the top of both transmission and differential gear housings give access thereto. These housings are oil tight, the only opening being at the top, as above mentioned, and may, therefore, be kept filled with oil at all times.



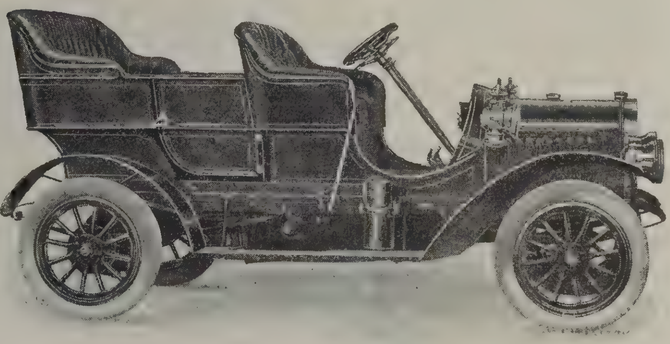
TOURING CAR, MODEL 24.

Owing to the balanced sprocket, on the lay shaft of the transmission gear, the sliding of gears is relieved of all the annoyance heretofore incident to this type of transmission, and whether the car be standing or running the gears can be instantly shifted from high speed to reverse or to any of the intermediate settings.

The second four-cylinder model is a forty-horse power touring car. Both models are equipped with a balanced clutch. This is an entirely new device by which the engagement may be made as gently as desired, but by virtue of the extraordinarily powerful spring by which the clutch is firmly seated, slipping is effectively limited.

The 1907 "Reo" cars, manufactured by the Reo Motor Car Company, of Lansing, Mich., are based on practically the same principles as the previous models put out by this concern. Among the noticeable features are the multiple disc-clutch; quiet chain; improved wear-resisting steering gear, and longer wheel base—which gives more room in front and in the tonneau; lower-setting body, with no less clearance; curved metal dash; and a shapelier and more graceful hood.

The runabout, which has accomplished excellent results in touring economy and other trials, is built the same as formerly. This car has already this season won several important victories, notably in the recent Chicago-to-Cedar Lake efficiency run. In this contest the Reo runabout, with an extra folding seat, carried four people 57 miles on 1¾ gallons of gasoline, the smallest amount used by any car in the contest. And this showing was made in the face of a heavy rain storm, which made the contest an unusually severe try-out for any car.

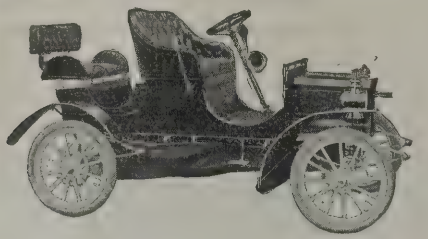


"RAMBLER" 5-PASSENGER TOURING CAR.

All of the Reo cars are well known for their power, speed, economy, durability and comfort, and the 1907 models give every promise of maintaining the favor which they now enjoy.

The machines shown in our illustrations of steam cars are the manufacture of the White Company, of Cleveland, Ohio, and a study of the picture quite clearly demonstrates the advancement of this car during the seven years it has been on the market.

On the left is the original model, built in 1901. Then follow in order the models of each successive year, terminating with the 1907 model on the extreme right. Tracing some of the steps in the development, and comparing, first of all, the 1902 car with that of 1901, it will be noted that the 1902 model was provided with a condenser and that the engine was completely enclosed; also, the comfort of the passengers received more attention, as evidenced by the addition of a top. In 1903 the car underwent a considerable change in the arrangement of parts, as well as in size. The engine was placed in front under the bonnet and the car took on the appearance of a "touring car," in the common acceptance of the term. Also, a compound engine took the place of the two simple engines previously employed.

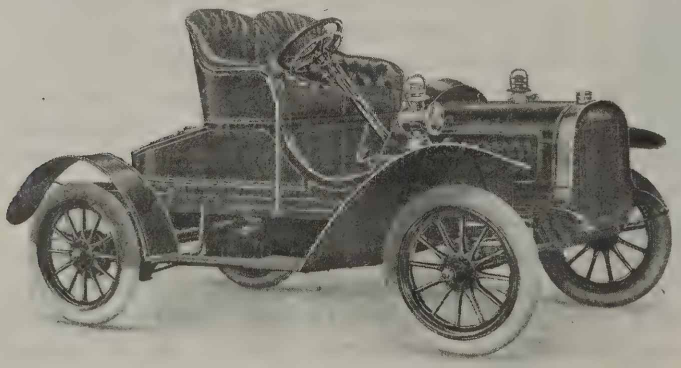


RUNABOUT, FITTED WITH REAR SEAT FOR CARRYING TWO EXTRA PASSENGERS.

In 1904 the alterations were not so pronounced, consisting of an increase in the size and luxury of the tonneau, longer springs, larger oil cups and other changes to adapt the machine to a wider range of action. In 1905 the wheel base, size of wheels, tonneau, etc., were again increased and, most important of all, the devices of the "free engine" and "emergency gear" were introduced.

In 1906 came a further lengthening of the wheel base, together with the introduction of the down draft burner, a side entrance tonneau, and numerous minor mechanical changes. In the 1907 model the normal seating capacity has been raised to seven, the power is practically doubled as compared with the 1906 car, and the improvements include a simplified regulating system whereby the pressure and temperature of the steam remain constant under all conditions.

It is interesting to note that the generator, the fundamental feature which distinguishes the White car from other machines, is absolutely the same in the latest car as in the first except, of course, for difference in size and capacity. The shaft drive has been consistently employed since 1903, as has also the compound engine of the vertical marine type.



LIGHT RUNABOUT, MODEL 27.

It is evidence of the longevity of the steam car that every one of the cars shown in the picture is in good running condition. In fact, excepting the 1901 and 1907 models, which are the property of the White Company, all of the cars shown are in daily use by private owners in Cleveland.

AUTOMOBILES IN HOLLAND.

Consul-General Listoe, of Rotterdam, describes the automobile trade in Holland as follows:

The import duty on automobiles in the Netherlands is 5 per cent. of the value. Nearly all motors use benzine, which can be had everywhere, and costs from 8 to 10 cents per liter (1.0567 quarts) retail. The restrictions with reference to the storage of benzine are very reasonable and do not affect the consumption. Motor cars are generally imported from European countries with the tires on. It seems, however, to be the opinion of dealers that it would be better to have American motor cars arrive without tires, but with steel Westwood rims, purchasers preferring to buy the tires here. Automobiles arriving by rail are usually imported set up in crates, but when arriving by vessel from the United States it is considered best to have them knocked down in cases. While the general condition of the roads and highways of the Netherlands is good, the country has thus far been a poor field for the sale of motor cars. Still there is a reasonable percentage of wealthy and progressive people in the Netherlands who can easily afford to be owners of motor cars; but the people are conservative, and it will take years before the advantage of owning an automobile will be sufficiently appreciated.

The dealers in automobiles do not, as a rule, purchase direct from the manufacturers; the trade is practically in the hands of appointed agents who have the cars in commission. In order to sell automobiles in the Netherlands, the cars should be on the spot for inspection with a live representative to solicit orders from dealers. At any rate, one machine should be sent as a sample, since every automobile must have a license, and this permit is not granted until the machine has been examined by a Government official. While there are no special obstacles to the introduction of American goods in Holland, there are no special advantages. The length of time it takes for articles ordered to reach the Netherlands, the smallness of the stock for inspection and to fill immediate needs, and the "cash against documents" payment system are certainly to the disadvantage of American manufacturers.

The fifth of the series of pamphlets which is being issued by the American Locomotive Company, of New York, has recently been published. This pamphlet is devoted to ten wheel type locomotives weighing less than 150,000 pounds, and will be followed shortly by another presenting the heavier designs of this type. The pamphlet illustrates and describes twenty-one different designs of ten wheel locomotives, ranging in weight from 64,000 to 150,000 pounds, and adapted to a variety of road and service conditions.

MOTOR BOATS AND MARINE ENGINES.

Motor boat building is today one of the most progressive industries in the United States.

The great show held during the latter part of February in New York city was the best proof of this. Boats of all kinds and for all purposes were exhibited in large numbers, and most of the leading makes of the country were represented. The abnormal racing type was absent, and it seems that no attempt is being made to advertise this class. Some of the boats are designed for high speed, but they are not extreme in any way, being very conservative craft, well suited to the service for which they are intended. In no cases are there extravagant claims of speed; 20 miles per hour is about the upper limit. This fact seems to indicate a very healthy condition of the business, because racing, although sensational, interests only a small fraction of the enormous number of motor boat men.

The general tendency of hull design, as seen at the show, seems to indicate a desire to produce a boat which will be more seaworthy and more easily driven in rough weather. Also, no racing boats were shown; their influence is noticeable especially in the line of the after bodies and in the formation of the sterns of the best models shown. Almost all the sterns are a variation of a form in which the hull is carried aft, moderately wide and rather flat. In the higher priced boats this is usually cut off by a V or a rounding transom, and in the cheaper class the transom is perfectly straight.

The popularity of the six cylinder motor seems to be on the increase in the motor boat field, as it is with the automobile maker and user, because of its beautiful balance and smoothness of running. For motor boat use most of the six cylinder motors are of large size, as the makers prefer to add to the number of cylinders rather than increase the size of bore and stroke. Most of these large six cylinder motors are so finely designed as to start on the switch, but several have air starting devices connected with three of the cylinders.

One company showed a six cylinder motor, designed especially for cruising boats, which has many features of novelty and can be arranged to run either on gasoline, kerosene, alcohol or distillate. This motor is a fine piece of workmanship and is solidly constructed. It is finished in French gray enamel and is fitted with reverse gear.

Another company has been manufacturing for some time six cylinder motors, which are both self-starting and reversible by compressed air, and this year has brought out a double acting motor built upon the same principles. This is manufactured in sizes up to 600 horse power. One of the 300 horse power size is shown. This motor is the one taken from the motor boat Standard, which made the world's record mile on the Hudson last fall.

HUNTING CABIN LAUNCH.

One of the big four cylinder open base four cycle motors seen at the show is destined to be used in a 60 foot boat, now building at City Island for Eben Stevens, which will be entered in the Bennett Cup race from New York to Bermuda in June of this year. The motor is a 50 horse power, and has cylinders of 9 inch bore and 10 inch stroke. It is designed to run only at 350 revolutions a minute, and represents a fine degree of engineering skill.

This race is the first long distance event in the open sea for motor boats, and extends over a distance of 600 nautical miles, so that reliability and wearing qualities will be fully tested out. Mr. Stevens won last year's race from Marblehead to New York with his boat Sis, equipped with a motor of the same make.

A motor which is a development of the automobile type is that taken from a well known speed boat. This is a four cylinder engine, of about 7 inch bore and stroke, and will give 120 horse power at 1,000 revolutions a minute. It is of the closed base type, mounted with its reverse gear and all controlling mechanism upon one base, ready to set into the boat. The weight of everything complete is only 1,200 pounds, which makes it one of the lightest for its power so far constructed in this country.

In Europe motors have been built which weigh only about 3 pounds a horse power, but to get down to this light weight durability and reliability have been largely sacrificed. A motor similar to the four cylinder 120 horse power engine described above was also exhibited, but this is designed to run at lower speed and is intended for a cruiser. Both motors are beautifully finished and attracted considerable attention.

The increasing popularity of American motor boats all over the world has been especially marked during the past year, and the large number of orders which leading manufacturers have already booked for shipment this season would seem to justify the predictions that the present year will be the most active in the motor boat industry ever seen in this country.

The American launch especially is meeting with continued and increasing favor in foreign lands, and in one of the accompanying cuts we show a type of hunting cabin launch which is said to be very popular abroad. It is the product of the Grand Rapids Gas Engine and Yacht Company, whose export office, in charge of Mr. E. Sherry, is located at 68 Broad street, New York city. A great many of this concern's launches of the open and cabin types, from 16 feet up to 60 feet lengths, have been shipped abroad. The company is building engines from 2 horse power up to 150 horse power of the two cycle and four cycle types, but devotes special attention to the larger sizes of four cycle engines.

When, a few years ago, reports were received by the company that in many countries gasoline could not be obtained for the operation of these engines, or, if so, at a practically prohibitive cost, attention was directed to the production of kerosene engines. The results obtained were highly gratifying, and the company is now turning out a perfect kerosene attachment to be applied to its four cycle engines.

The exhibit of engines which this concern had at the motor boat show attracted unusual attention, and resulted in the booking of a number of important orders, among them being three engines of 75 horse power for kerosene, several of 60 horse power, and many others of smaller size.

During the progress of the motor boat show the company was approached by an official of the Government with a request to submit full particulars on the kerosene engines. Actual tests have proven, it is claimed, that the cost of operation of the kerosene engine is about one-half less than gasoline, and that kerosene will develop more power than gasoline. In this country, however, gasoline is generally preferred, especially for pleasure craft, as the additional expense here is a matter of minor importance, but these engines have been especially built for the accommodation of foreign trade in countries where gasoline can not be obtained or its use is prohibited by the laws.

One of the accompanying illustrations represents a gasoline launch of remarkable qualities which was designed and built for the Mexican Petroleum Company, of Tampico, Mexico, by the Gas Engine and Power Company of New York City. It is an exceptionally roomy, comfortable, seaworthy and speedy type of launch, and one that is particularly adapted for service in tropical climates, where the navigable waters are shallow and do not permit of deep draught boats.

The launch is 32 feet long, 7 feet beam, and is built with a tunnel type of stern, in order to admit of the vessel navigating in shallow waters, her draught being less than 20 inches loaded. The construction consists of oak keel, stem, sternpost, frames and planksheer, and cedar planking, copper fastened. The interior finish of the joiner work is in ash and oak. Lockers are located under the seats. The launch is fitted with a standing roof and side curtains, and is complete with steering wheel and all the necessary equipment.

28 H. P. GASOLINE LAUNCH.

The motive power consists of a four cylinder 6x6 inch "Speedway" gasoline engine of 28 horse power. In a trial trip made just previous to the shipment of the launch to Mexico a speed of about 13 miles per hour was attained, with an against the tide. The hull of the boat is sheathed with copper, and all outboard fittings are of brass or bronze.

During the past season some phenomenal speed records have been made with some of the motor boats which have been placed upon the market. Conspicuous among these have been the products of the Brooks Boat Manufacturing Company, of Saginaw, Mich. One of the company's boats, illustrations of which are shown herewith, made a measured mile in still water in 2 minutes and 8 seconds, or 28 miles per hour, the boat's motor power being a 60 horse power, six cylinder engine. Other records made by the company's boats were 16½ miles per hour with a 30 foot boat driven with a 10 horse power engine, 8½ miles per hour with a 20 foot boat driven with a 2 horse power engine, this latter being one of the best speeds ever made with a 2 horse power engine.

The boat shown in illustrations on this page was originally designed to enter the European races, and for that reason was built to the limit of the restricted length (10 meters). It is built of light oak, frame trussed, is planked double skin, one-eighth inch cedar on the inside, with one-quarter inch on the outside, and canvas between. It is driven by a 60 horse power, six cylinder engine, the weight of the latter being 950 pounds, and that of the boat, without the engine, 1,000 pounds. In all of the races in which this boat participated last season it maintained its high record for speed and endurance.

When it was first brought out its record was 2 minutes and 18 seconds. The company experimented with wheels, and the record of 2 minutes and 18 seconds was made with a 30 inch wheel. A 28 inch wheel was then adopted, and a mile was made in 2 minutes and 12 seconds. A 26 inch wheel was next tried, resulting in a record of a mile in 2 minutes and 8 seconds. In all of the races in which the boat took part last season the 26 inch wheel was used.

This company is the originator of the Pattern System of boat building, and furnishes patterns for 100 styles of motor boats. It also furnishes all boats in the knock-down form. The new plant of the company is equipped throughout with the latest machinery, and the sale of its products is steadily increasing.

The novel design and ingenious principles expressed in the three-cylinder auto-marine engine, illustrated herewith, will no doubt make a detailed description of its construction of interest to all users of this class of motors. It is the 1907 model of one of the largest marine engine manufacturers in the world, and in its construction every new and improved feature known to marine motor building is said to be embodied. These engines are made with one, two or three cylinders, and in sizes from 1½ to 25 horse power. The illustration shows a three cylinder engine, which in construction is exactly the same as the one and two cylinder types.

RACING MOTOR BOAT, DRIVEN WITH 60 H. P. ENGINE.

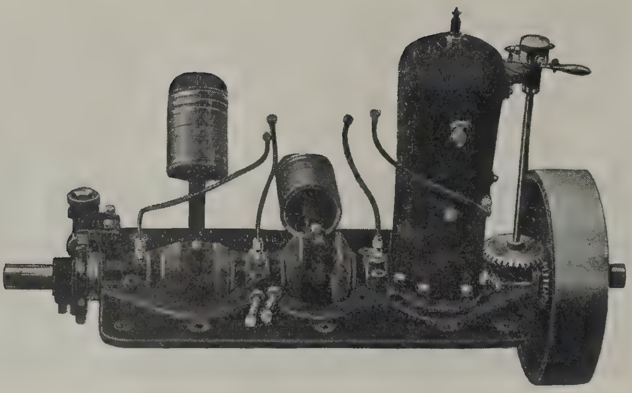
RACING BOAT, WITH RECORD OF 28 MILES PER HOUR.

The cylinders of the "individual type" are made from the best grade of air furnace iron, with a flare increasing from the bottom up. They are independent of and carry no shaft bearings, there are no joints under pressure, and no water pipes nor visible external connections.

The pistons with four rings are of the same quality iron as the cylinders, and pistons, rings and cylinders are ground to a metric fit. Connecting rods are forged from the solid open hearth high carbon steel, especially treated at the fire to develop maximum strength and toughness. There is no bearing at the upper end of the connecting rod, the hollow piston pin being rigidly clamped so as to rock with it, thereby giving the engine double the strength and bearing surface of the average engine. The crank pin bearing cap at the lower end is adjustable, no lock nuts being used, but instead a strong wire seal, which cannot loosen.

The piston pump is mounted independent of everything on the engine base (crank case) instead of on the cylinder. The valves are large and adjustable, and there are no pipes to the engine whatsover. Water enters each cylinder jacket separately by a hidden branch passage leading directly from a large concealed main to the pump. An exclusive feature of this engine, by which the cylinders never get too hot, and a uniformly cool temperature is maintained, insures perfect action of the lubricating oil.

Two complete sets of hardened steel ball thrust bearings, one on the forward and one on the after end of the crank shaft, prevent end strains on the cranks, connecting rods or pistons, no matter how large a propeller is used. The self-contained, interchangeable construction of the engine is shown in the illustration, where the crank shaft and its three moving parts—piston, connecting rod and pump—are seen resting independent of cylinders in the crank casing (engine base). The base, foundation flanges and lower half of the crank case are in one piece, on which are mounted, independently of each other, all the principal elements of the engine, enabling any part to be removed without disturbing the adjustment of other



THREE-CYLINDER AUTO MARINE ENGINE.

parts. There are scant clearance crank casings, providing the high crank case compression so essential in a two cycle engine, while the leakage of this compression and loss of gasoline mixture, so often found in other makes of engines after a brief service, is entirely obviated by the use of adjustable crank shaft bearings. Thus has been overcome one of the most serious drawbacks ever urged against the two cycle principle.

Gun bronze gears, one on the flywheel and the other on the timer shaft, provide a simple, positive drive and insure absolute uniformity of ignition and saving of battery by occurrence of sparks at the correct time for which the timer is set. The timer contacts can be instantly taken out and reversed or returned by simply unscrewing two turns the screw shown in the upper end of the timer shaft.

If there is one thing more than another that should receive the attention of the best skill in mechanics it is the oiling system of a marine gasoline engine. Since the lubricant which is fed to the cylinder is constantly consumed by the great heat, it is necessary to feed slowly just sufficient oil to keep perfect lubrication, but the supply must be constant and never failing. The makers of this engine, the Ferro Machine and Foundry Company, of Cleveland, Ohio, use a positive pressure oiling system, which consists of a battery of sight-feed valves supplied with oil from a reservoir in which a sufficient pressure on the top of the oil is maintained automatically by the operation of the engine. From each sight-feed valve pipes carry the oil in a steady stream direct to the respective bearings—cylinder, piston and hollow piston pin, each of the main bearings, thrust bearings and crank pin.

The carburetor is a special patented feature of this engine, and is said to be the only carburetor made that is designed strictly for marine service and conditions. It is shown attached to the inlet header, which is of heavy iron, to absorb enough heat to remain slightly warm, insuring absolutely uniform temperature of the mixture. The feed is automatic and no adjustment is required. By using a lever operated compound throttle, instant change of speed, independent of the timer, can be had, varying from 150 to 900 revolutions. The speed control of this engine is said to be as perfect a system of regulation as has ever been obtained with a two cycle engine, and it is even unsurpassed by many four cycle engines.

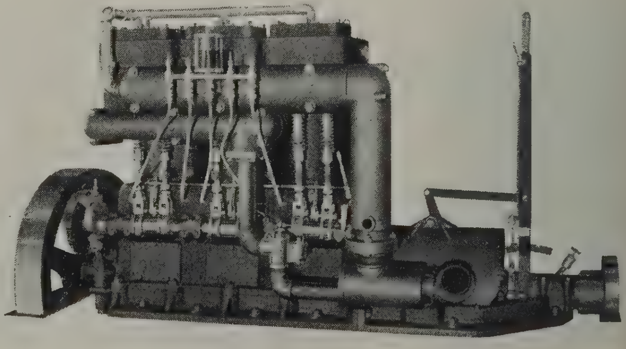
With all except the smallest size engines an exhaust silencer is supplied. This consists of an exhaust header and condenser silencer combined, obviating the large ugly casting so often seen in this style of engine. The use of a muffler, with its accompanying hot pipes, is not necessary, as the overflow of cooling water from the jacket discharges with a noiseless underwater (submerged) exhaust, which is absolutely free from back pressure in starting the engine. This device is said to be the only "non-back pressure at starting" submerged exhaust made.

Every part of these engines is subject to a series of severe tests. Cylinders must stand up under a water test of 150 pounds to the square inch. In addition to a brake test, the engines are run continuously for from twelve to twenty-four hours with a load coupled direct to the shaft requiring twice the power of its propeller turning in deep water. Each engine is required to prove easily more than the rated horse power, and it is then inspected, numbered and tagged with the record. Each purchaser gets this record, and therefore knows specifically the power of his engine.

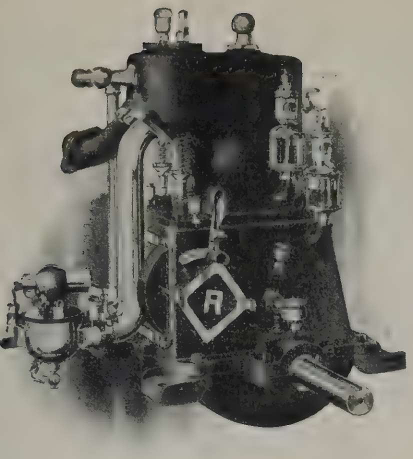
The engines are handsomely finished with black enamel, smooth and durable, with highly polished fittings.

The four cycle marine motor represented by the accompanying cut is one of the most improved and successful engines of the kind now in use. Though simple in construction, it is strong and powerfully made, and is capable of remarkable speed in operation. In addition to these features it possesses another important advantage, namely, that it will use with equal efficiency and economy as fuel either gasoline, alcohol, distillate or kerosene, and with no change in the motors in any respect. Any one of these fuels is introduced to the motor through a specially constructed vaporizer, and in using kerosene it is not necessary to resort to pumps, outside fire or torches, as the fuel is vaporized in the same manner as when using gasoline. This vaporizer is used in addition to the regular carburetor with which all of these engines are equipped.

The use of kerosene in these engines is not an experiment, as it is now much used in Cuba, in South and Central America, and in several European countries,



FOUR CYCLE MARINE MOTOR.



SINGLE CYLINDER MARINE ENGINE.

especially in Denmark, where many of these motors are in successful operation. In using kerosene the engine has reached that stage of perfection where it operates with a smokeless exhaust, which shows perfect combustion.

These four cycle marine engines are manufactured by the Wolverine Motor Works, Grand Rapids, Mich., in sizes from 12 to 100 horse power, all being in three cylinders, with the exception of the 12 horse power, which is built in two cylinders only. They are built of the best obtainable quality of materials, are positive in action, economical in the consumption of fuel, and are so constructed that they are under absolute control of the operator at all times, under low as well as high speed.

The motors are equipped with reversing clutches, composed of steel spur gears, accurately cut and always in mesh, but never in motion except in backing, and these clutches are adjusted by means of four set screws on the outside. The motors are equipped with relief cams for easy starting, a decided improvement over the usual relief cock, and which do away with all smoke or odor in the boat when starting the motor. All valves are mechanically operated, which makes a quiet running machine.

A display which attracted unusual attention at the recent Motor Boat Show was the exhibit of storage batteries and electric lighting equipments for small craft of the Witherbee Igniter Company, New York. The excellent quality of the Witherbee battery for motor ignition is already very well known in all parts of the world, as more than 60 per cent. of automobile and motor boat manufacturers specify these batteries as part of their regular equipment, but the show brought forward an entirely new department, upon which this company has been at work for some time.

Marine lighting and ignition has been a vexatious problem for small boat owners. To find a battery and generator which would withstand the exposure to water and moisture, always present in a small pleasure craft, has been the aim of every yachtsman. That the Witherbee battery is proof against these elements was fully demonstrated in their novel exhibit.

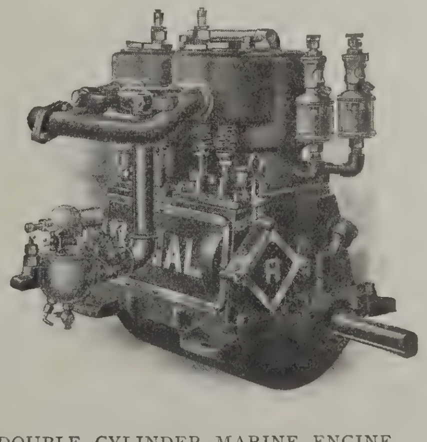
A model yacht, dressed and lighted, floated in a large tank, upon the bottom of which, completely submerged, rested the battery which furnished the current; this demonstrated conclusively the water and moisture proof qualities of the battery. A miniature diver, whose helmet was equipped with a searchlight (also fed from the same battery), was exploring the depths.

The company's lighting equipment includes every required appurtenance, and is simplified and arranged so that the average amateur can install and maintain the plant without difficulty. Automatic cut-outs on the switchboard regulate the flow of current from the generator, doing away with the necessity of continually watching the voltmeter to see that no return current is taking place, expending the battery uselessly. These equipments are so constructed that the battery stands fully charged up to its full voltage and amperage whenever the motor stops, giving lighting power when at anchor.

Other illustrations shown here represent marine engines of the high speed, four cycle type, said to be unsurpassed for their efficiency, reliability and economy in operation. They are built for pleasure boats, and are made in 1½ horse power, 3 horse power and 5 horse power, single cylinder; 8 horse power and 10 horse power, double cylinder, and 20 horse power, four cylinder.

The cylinders are cast with solid heads, so that there is no packing to blow out. The valves are interchangeable and mechanically operated by tool steel cams and rollers from a single cam shaft. The gears and adjustable crank shaft bearings are made of phosphor bronze, and the steam hammered crank shaft is made from solid billet of open hearth steel. All the working parts are enclosed in the crank case and have direct lubrication. No splash system is used; the oil is taken directly to the part requiring it, and this insures life to the engine and much economy in operation.

The connecting rods are made of annealed steel, with take-up at each end; the bearing on the shaft end is genuine babbitt and on the piston end bronze. All valves are accessible and may be easily examined by



DOUBLE CYLINDER MARINE ENGINE.

turning out the large plugs that are located in the cylinder directly over the valve head. The spark plugs are waterproof, and the commutator is enclosed in a water tight box, so there is no chance for the engine to short circuit if covered by spray or caught in a storm. The engines are all compact in design, and embody all the improved features that long engine building experience has demonstrated to be essential to the highest efficiency. They are always reliable, and the amount of gasoline they consume is said to be not over one-half the amount required for a two cycle engine of same horse power.

The manufacturers, the Regal Gasoline Engine Company, of Coldwater, Mich., have also just completed a line of heavy slow speed marine engines designed particularly for hard service in fishing or commercial boats. They are built in the following sizes: Six horse power single cylinder, 12 horse power double cylinder, and 24 and 45 horse power four cylinder. These engines are all four cycle, with mechanical valves and of heavy construction throughout. They are equipped with the jump spark ignition.

This company's various styles of engines are becoming very widely known and used throughout the world. The concern has distributing agencies along the Atlantic and Pacific coasts; also in Australia, Tasmania, New Zealand, Fiji Islands, Russia, Finland, Sweden, Belgium, Italy and England. The company is also desirous of obtaining agencies for countries not contracted for and would be glad to open up correspondence with any one interested.

MOTOR BOATS AT VENICE.

Consul Paul Nash, of Venice, writes that the peculiar situation of Venice should make it an especially good market for motor boats. He continues:

At present the number of boats in use is, perhaps, thirty or forty, the reason for this small number being the high prices charged by local boat builders and Italian motor manufacturers, plus the exorbitant duty on naphtha. I have never doubted that American manufacturers could introduce their motors here with success, provided they were willing to do business upon a sensible basis instead of persisting in the absurd idea of requiring cash with order, or against documents. An illustration of this has recently presented itself to me, and may be of interest as showing the futility of certain American business methods.

Some months ago, at the instance of a large manufacturer of motor boats, I endeavored to find an agent for him in Venice, and after some difficulty succeeded in doing so. This agent, provided with a catalogue, secured six orders, on the condition that he should demonstrate that the claims of the manufacturers as set forth in the catalogue were true. In order to do this it would have been necessary for the agent to send the price of a sample boat to a firm of which he knew nothing beyond their printed claims. This he was not willing to do, and as the manufacturers would not send a boat to be paid for after trial the obvious conclusion was that they knew their boats would not be satisfactory. Thus an excellent chance for the introduction of a line of manufactures little known in Italy was lost to American commerce, and the impression produced here by the treatment of this agent has increased the prejudice against our business methods.

Properly handled, I believe the market to be capable of great development in this country, and the Italian lake district should also offer an especially favorable opportunity for the sale of motor boats. In order to prove my contention that a high-class boat could be brought to Venice from the United States at a considerable saving on the prices charged by the Italian manufacturers, I have recently imported a 20-foot boat with a 4 horse power motor, at a total cost of about $625, including duty, whereas to build the same boat here, were it possible to do so, would cost fully $200 more. This boat has, I hope, served its purpose as an object lesson, by dispelling the general impression that American motors are necessarily less economical of benzine than those of local manufacture.

MOTOR CARS FOR THE SOUDAN.

A car of suitable design for the Soudan should embody the following: Powerful engine; metal wheels; substantial gear-box, with high and very low gears; efficient radiation; clutched to withstand frequent slipping; strong springs; weight suitably distributed on the frame; carrying capacity for large supply of fuel and water, spare parts, and a certain amount of luggage; and all working parts must be carefully inclosed as a protection against sand.

Motor cars for the eastern desert district of Egypt (the mining district) should come within the following specifications: Light cars, capable of carrying two people and hauling two in trailer; water and radiator value up to 100 miles at average mean speed of 10 miles per hour; petrol capacity, 120 miles; cars well sprung fore and aft on long springs; pneumatic wheels for cars averaging 15 miles per hour; cushion or solid tires for cars averaging 10 to 12 miles per hour; power, 6 to 12 horse power for light cars, 9 to 15 for heavy; light cars to average 15 miles, and heavier 10 to 12, and pull 7½ hundredweight plus weight of trailer; front wheels, 36 to 42 inches diameter, with 4 to 6 inches face; rear wheels, 26 to 32, with 5½ to 9 inches face; engine, two cylinders, simple, and as near fool proof as possible; firing accumulator and coil, also magnet, methods unchangeable; gear cannot be too simple or strong; reverse on heavy cars, but not on light; speeds, two—top 12 to 15, bottom, 3½ to 5; pedal clutch; pedal brake and lever brake, former on front wheels, latter on back; engine speed not over 1,000 per minute; lubricating as near automatic as practicable; lights, carbide, with lens fronts; oil tanks not less than 200 miles capacity; carburetor approved float type. Essentials: Light and strong and easy on track.

VIEW OF MONTREAL FROM MOUNT ROYAL.

Foreign Trade of the Dominion of Canada.

The Dominion of Canada embraces an area of 3,745,574 square miles, and has a population of about 6,000,000. In spite of such a comparatively sparse population, industries and commerce have made tremendous progress during the last twenty-five years.

Canada has a marvelous system of canal, river and lake navigation, over 2,700 miles in length, and vessels from the lake ports reach the Atlantic without breaking bulk. Up to the present time over $100,000,000 has been spent on canals for construction alone, and it is estimated that now nearly 30,000 vessels, aggregating 9,000,000 tons, pass through the Canadian canals every year, carrying more than 200,000 passengers and over 8,000,000 tons of cargo.

The Dominion of Canada has an equally well developed network of railways. The Canadian Pacific Railway's main line from Montreal to Vancouver is 2,906 miles in length. By means of this railway, and a line of Pacific steamers subsidized by the Imperial and Dominion Governments, Montreal and Yokohama have been brought within fourteen days of each other. There is also a monthly steamer service between British Columbia and Australia.

It is a well known fact that Canada possesses immense agricultural resources. According to a recent official report, over 20,500,000 acres are now under crop. The cereals most widely cultivated are wheat and oats.

The timber wealth of Canada is also very great, lumbering being one of the most important industries. The forest area is estimated at 1,248,798 square miles, while the forest products represent now a value of nearly $14,000,000 a year.

The total value of the products of the fisheries of Canada amounted in 1905 to more than $23,000,000.

Immense progress has also been made in the mining industries, Nova Scotia, British Columbia, Quebec, North and West Ontario, part of the Northwest Territories and Yukon Territory being the chief mining districts. In 1905 the total value of the mineral produce of Canada aggregated $70,000,000. The principal minerals mined include gold, coal, nickel, copper, silver, lead, iron and asbestos. It is estimated that the coal bearing area of the Northwest Territories extends over 65,000 square miles.

That with such tremendous natural resources and a highly intelligent population the industries and commerce of the Dominion have made great strides ahead is but a matter of course.

The growth in Canadian exports during the past decade is an interesting demonstration of the fact that Canadian manufacturers are keenly alive to the benefits to be reaped from a vigorous cultivation of foreign markets.

Twenty years ago, in 1886, the value of the total exports from the Dominion of Canada was $85,251,314 and of the imports $104,424,561.

Ten years later, in 1896, the exports represented a value of $121,013,852 and the imports $118,011,508.

During the last fiscal year ended June 30, 1906, the exports of the Dominion amounted in value to $256,-

586,630, or more than double the exports of ten years ago.

The two largest purchasers of Canadian goods abroad have been for many years, and still are, Great Britain and the United States. Of the total exports of the last fiscal year, $133,094,937 in value were sent to Great Britain and $97,806,552 to the United States.

MONTREAL HARBOR.

The next largest customers, in order of importance, were Australia and New Zealand, West Indies, France, the Argentine Republic, Germany, Belgium, Cuba, China, Brazil, Holland, Porto Rico, Japan, Mexico, Chile and Russia.

It would fill too many columns to discuss in detail all the various classes of goods exported from Canada, and we therefore confine our remarks to the principal items of manufactures in which our readers will be most interested.

In more than one line of manufactured goods Canadians have made remarkable progress in the world's markets. This is especially true of agricultural implements and machinery, of which the exports during the last fiscal year represented a value of $2,497,601.

The two largest customers of Canadian made agricultural implements were Australia and Germany, the former country having taken $523,030 worth and the latter $443,703 worth. Then came France, with $293,536; Great Britain, with $236,955; the Argentine Republic, with $256,006; Russia, with $180,175; New Zealand, with $143,304; Holland, with $100,102; South Africa, with $94,042; the United States, with $67,024; Roumania, with $41,916; Chile, with $30,457; Italy, with $23,004; Spain, with $21,695, and Sweden, with $16,870, while the rest went to South America, the Far East and other foreign countries.

From these figures it will be seen that Canada's agricultural appliances are highly appreciated in all parts of the world.

Quite considerable are also the exports of hardware, which, during the year, aggregated in value $350,955. In this line, too, the exports were well divided, the largest customers being Great Britain, West Indies, Germany, Holland, South America, the United States and British Africa.

Manufactures of steel were exported to the value of $347,967, the largest quantities having been shipped to Great Britain, British Africa, Australia, West Indies, the United States, South America and countries of Continental Europe.

Canadian made typewriting machines were exported to the value of $143,633, chiefly to Great Britain, Belgium, France, Germany, Holland, Italy and Sweden.

The exports of electrical apparatus are not very large, but increasing, the total value during the last fiscal year having been $25,000.

Non-specified machinery exports aggregated in value $481,689, the largest customers having been Great Britain, Australia, South Africa, the United States, European countries, Mexico, South America and Far Eastern countries.

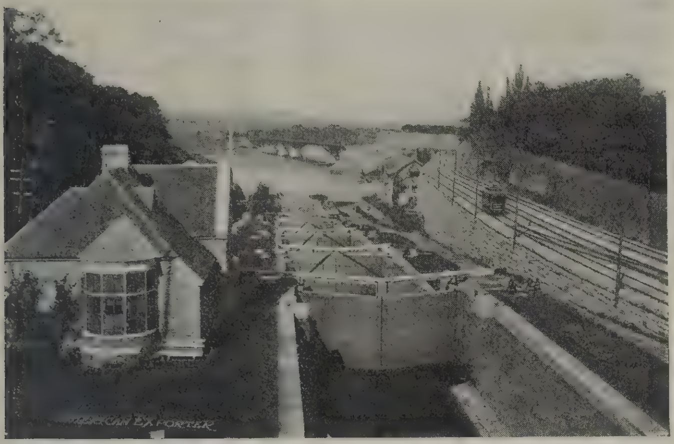
Considerable quantities of vehicles are also exported from Canada. Thus, during the last fiscal year, the exports of carriages were valued at $49,080; those of carts at $19,247; of wagons, $5,177; of automobiles, $63,329; of bicycles, $95,962, and of other vehicles not specified, $55,380.

We already mentioned that Canada possesses an immense timber wealth and that lumbering is one of its most important industries. As a matter of course, therefore, the exports of all kinds of woodenware are large and steadily increasing; thus the exports of household furniture during the last fiscal year amounted in value to $283,606; those of doors, sashes and blinds, $263,081; matches and match splints, $109,112; moldings, trimmings, pails, tubs, churns, barrels and other manufactures of wood to more than $25,000. That Canada is a large wood pulp producing country is well known. The exports of Canadian wood pulp represented a value of nearly $4,000,000 during the last fiscal year, the three largest buyers having been the United States, Great Britain and France.

Large and increasing also are the exports of paper, which last year represented a value of $2,006,624. The best customers of Canadian paper were Great Britain, Australia, New Zealand, United States, British Africa, the Argentine Republic, Cuba, Japan, Mexico, Peru and British West Indies.

BUSINESS DISTRICT, TORONTO.

Canadian leather and leather goods are today to be found the world over. The exports of sole leather aggregated in value $1,592,631, the largest quantities having been shipped to Great Britain, Belgium, Newfoundland, British Africa, United States and Continental Europe.



CANAL LOCKS NEAR OTTAWA.

Upper leather was exported to the value of $272,616, while non-specified leather exports represented a value of $385,784. Canadian boots and shoes were exported to the value of $133,792, harness and saddlery exports aggregated in value nearly $7,000, and other manufactures of leather a value of $25,521.

That the Dominion of Canada has also made great progress in its chemical industries is evidenced by the fact that the exports of drugs, chemicals and medicines represented a value of $1,172,012.

The exports of Canadian cotton fabrics are also steadily increasing. During the last fiscal year they amounted in value to $1,246,734. The largest individual buyer was China, which took 9,624,602 yards, valued at $635,611. Other large customers of Canadian cotton fabrics were Australia, British Africa, Newfoundland, New Zealand, Japan, Mexico, Norway, Panama, Turkey, Uruguay, Venezuela, Argentina, Brazil, Chile, Central America, Ecuador, Egypt, Germany, Holland and Russia.

Other manufactures exported in large quantities include cartridges, cordage, ropes and twine, explosives and fulminates, artificial fertilizers, glass and glassware, household effects, manufactures of India rubber, musical instruments, especially organs and pianos, soap, etc.

Among Canada's best export markets for manufactured articles naturally are the colonies of Australia and New Zealand. During the fiscal year ended June 30, 1906, the value of Canadian exports to Australia was $2,072,702, of which $1,414,685 consisted of manufactured products. During the same period New Zealand imported $729,303 of Canadian products, of which $597,288 represented finished articles. These figures, while not large, show an encouraging demand for colonial made goods on the part of the two colonies.

The article of chief importance in Canada's trade with Australia and New Zealand is agricultural machinery. In this line the exports to Australia and New Zealand amounted last year, as already stated, to $523,030 and $143,304, respectively, the great bulk being furnished by the well known makers in Toronto who operate their own branches in the principal cities of the two colonies.

The balance of the exports is made up principally of paper and manufactures of iron and steel, such as hardware, machinery, nails, bicycles, etc. New Zealand, for example, imported from Canada hardware to the value of $34,327, as against the Australian imports of $12,356. On the other hand, Australia imported furniture amounting to $31,134, as compared with New Zealand's $10,098. Under the heading of furniture the principal article is doubtless bentwood chairs, which compete favorably with the Austrian chairs.

Considerable stimulus has been given to Canadian trade in Australia and New Zealand by the work of the Canadian commercial agents located in Melbourne and Sydney. The duties of these agents, who are direct salaried representatives of the Canadian Government, are to collect and transmit to the home Government data concerning the opportunities for business in general, the lines that find the readiest sale, and whence they are imported, market values, prevailing styles and, in fact, any and every point that will assist the manufacturer to meet the requirements of the market. They travel at frequent intervals in order that they may keep in touch with changing conditions in all parts of the colonies, and are constantly on the lookout for new openings of value to the manufacturers at home.

Of especial interest in connection with Canada's trade with New Zealand is the recent communication to the Canadian Government from the executive board of the Christchurch Exhibition, complimenting both the Government and manufacturers on the keen interest displayed by Canada in the New Zealand Exhibition at Christchurch. Great pains were taken to make the Canadian exhibit one of the principal features of the exposition. Apparently, very few countries realized the importance of the Christchurch Exposition or were sufficiently familiar with the value of the New Zealand market, since international participation was comparatively small.

MARKET PLACE. MONTREAL.

THE PORT OF QUEBEC.

The name of Quebec has been familiar as a household word in maritime and commercial circles in Great Britain and in most Continental ports for more than a hundred years. Favored by nature, Quebec possesses the finest natural harbor on the St. Lawrence, if not in the world, and one where the entire British navy could safely ride at anchor, and where the largest vessels now afloat or likely to be afloat could be safely accommodated.

Quebec is situated on a promontory near the confluence of the St. Lawrence and St. Charles rivers, about 400 miles from the mouth of the St. Lawrence, and the harbor extends for about 8 miles above and 6 miles below the city proper, thus giving a water frontage available for vessels of the deepest draught not exceeded, even if equaled, by any other harbor in the world.

The following railways reach Quebec: The Intercolonial Railway Company, from maritime provinces and Montreal; the Quebec Central Railway, from Boston, New York and other New England points; the Canadian Pacific Railway, from Vancouver and the Canadian Northwest; the Great Northern and Quebec Railway, from Hawkesbury, where it connects with the Canada Atlantic; the Quebec & Lake St. John Railway Company, and the northern district, and the Quebec Railway, Light & Power Company, along the north shore of the St. Lawrence.

The construction of the Grand Trunk Pacific, of which Quebec will be the terminal point for at least seven months of the year, will bring into her ample harbor the teeming products of the great West, and the as yet undeveloped and almost unknown wealth of northern Ontario and northern Quebec. The increased and increasing tonnage of the ocean carriers is another point in her favor, as in her magnificent harbor vessels of any draught can be accommodated, and it is now fully recognized that, if the Dominion does not want to see the trade that should come via the St. Lawrence transferred to the United States, seaport steamships must be used equal to and of as great a carrying capacity as the immense boats that are now doing the carrying trade to and from the United States, and for this class of vessels Quebec is the natural and only harbor on the St. Lawrence.

PORT OF QUEBEC, EAST.

PORT OF QUEBEC, WEST.

The wharf and dock facilities of the harbor have been pronounced equal to those of any harbor on this continent, and are capable of receiving vessels of the deepest draught.

In the Quebec graving dock, the property of the Dominion Government, vessels of almost the largest size can be docked and repaired, as this dock has been recently lengthened.

In the vicinity of Quebec, on the line of the Quebec & Lake St. John and Great Northern & Quebec Railway, at Shawenegan Falls, Grand Mere, Chicoutimi and Roberval, large factories have been erected for the manufacture of wood pulp, paper, etc., for export, whose shipping point is Quebec, and this trade, though yet in its infancy, gives promise of immense development in the near future. The timber exports developed in the country north of Quebec by the Quebec & Lake St. John Railway Company have also to find their shipping points at Quebec, principally from the Louise Docks, and this also, like the wood pulp, promises to give greater outputs year by year.

All this country is subsidiary to the port of Quebec as its shipping point.

The Louise Docks in the harbor of Quebec consist essentially of two shipping docks. The outer or tidal harbor has a water area of twenty acres, with a quay frontage of 3,150 feet; the outer or wet dock in which the constant level of high water is maintained by a set of entrance gates, has a water area of forty acres, and a quay frontage of 3,500 feet. Each of these docks can accommodate vessels having a draught of thirty feet.

These docks are divided by a cross wall 800 feet long and 150 feet wide, and are enclosed on the north by the Louise embankment, 400 feet long by 330 feet wide. The Point-à-Carcy Pier, with extension, forms the south side of the tidal harbor, while railway terminals, private wharves, and 1,000 feet of Commissioners' frontage bound the wet dock on the south or city side.

On the river front the breakwater enclosing the new pier has a frontage of 20,000 feet, with a depth of over 50 feet at low tide. The Point-à-Carcy Pier has a river front of 580 feet, with over 45 feet of water at low tide. The wet dock is devoted principally to the lumber and coal business; large areas in these docks have to be reserved for general cargoes, etc.

The tidal harbor and Point-à-Carcy berths are for more general cargoes. There are two grain loading berths in the tidal harbor and one at the Point-à-Carcy Pier, served by two elevators, one of 1,000,000 bushels capacity and the other of 250,000 bushels.

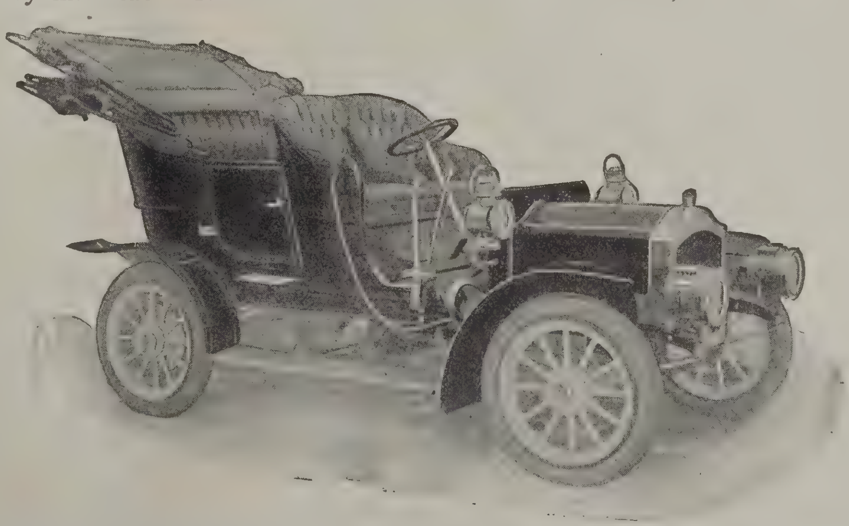
Freight sheds line the face of the docks, furnished with electric lights both inside and along the dock front. They have a combined floor surface of some 174,000 square feet, and have in all cases railway tracks along their shore faces.

The present dock surface is some fifty acres in extent, on which there are about 6½ miles of railway tracks owned by the Commissioners.

POPULAR CANADIAN TOURING CAR.

The part which the Dominion of Canada takes in supplying the great and constantly increasing demand for auto vehicles of all kinds is by no means a small one, and the various machines produced by manufacturers in that country are now found successfully competing with American and European makes in all parts of the world.

A typical example of a high grade Canadian made touring car is shown in the accompanying illustration, same being one of the 1907 models of the Canada Cycle and Motor Company, of Toronto Junction, Canada, whose "Russell" cars have won such pronounced favor with automobilists. These manufacturers are now offering touring cars of 18, 25 and 40 horse power, the latter being a new design and known as their Model F car. The 18 horse power car is shown in the cut.



TWO-CYLINDER EIGHTEEN HORSE POWER TOURING CAR.

The Model F was designed to meet the demand for a high powered and luxuriously appointed machine. It has a four cylinder vertical engine of 40 horse power, the cylinders being 4¾ by 5 inch offset. The body is of unusually handsome design, and has roomy accommodations in the tonneau seat for three passengers and provision for two extra seats, so that in all seven passengers can comfortably be carried.

The ignition employs as exciters both accumulator and magneto, connected by a double throw switch, so that either can be used at will. By using a common distributer for the two systems, the necessity of having two sets of secondary wires and two sets of spark plugs is obviated. Ample water circulation is positively obtained by the use of a centrifugal pump.

The front axle is made of special steel of great toughness. The frame is constructed of pressed chrome-nickel steel of channel section, with four cross bars of channel section and two longitudinal steel angle bars riveted to the cross members to stiffen the side members and carry the engine and transmission. The spring suspension consists of two semi-elliptic springs in front shackled at the rear end and two semi-elliptic springs in the rear, shackled at the forward end to a cast manganese bronze support and to a cross spring in the rear. The control is mounted in the steering wheel, but is independent of it. The wheels are 34 inch wood, of artillery type, with annular ball bearings of large size.

The other two models are the four cylinder vertical 25 horse power Model E and two cylinder 18 horse power Model D, of 104 inch and 90 inch wheelbase, respectively. In these two models the frame is of the armored wood type, most suitable for cars of this weight, combining as it does the strength of steel with the flexibility of wood. Magneto ignition is not supplied in these two cars, but the source is ample in each case, there being two separate sets of dry cells in Model D and one accumulator and one set of dry cells in Model E.

The general lines of construction embodied in these three models are the most improved and up to date, such as the metal-to-metal disc clutch, selective sliding gear transmission, universal joint between clutch and transmission, and splash lubrication from gear driven pump.

The drive is by means of propeller shaft and bevel gears to live axles encased in strong tubes, which take the weight of the car and on which the car wheels revolve. These tubes are attached firmly to the driving gear case in which is situated the differential, which is of the spur type. All these parts are particularly strong.

The braking system consists of two external contracting hand brakes and two internal expanding brakes. The external brakes have gray iron liners, and the internal bronze rubbing strips, so that, besides being positive in action and quick to release, these brakes are also designed to withstand wear and to be easily replaced.

VALUABLE ROUTE BOOK FOR AUTOISTS.

The White Company, of New York City, has just issued for free distribution to all motorists its Route Book No. 2, which gives complete and detailed road directions from New York to the Jamestown Exposition, Norfolk, Va. Included in the book are the routes to and from such important cities as Philadelphia, Lancaster, Gettysburg, Harrisburg, Reading, Hagerstown, Winchester, etc., comprising in all more than 1,100 miles of road. Every turn in the road, every fork where the tourist might hesitate as to which way to go, is accurately described and its mileage given.

In addition to the turns, specific notice has been made of every railroad crossing, so that tourists provided with this book may use proper caution in approaching these crossings. The book is profusely illustrated, showing views of the country traversed, including, among other subjects, some fine pictures of the battlefield of Gettysburg. The book also contains a good map, as well as descriptive articles which give the tourist a very good idea of the character of the several routes.

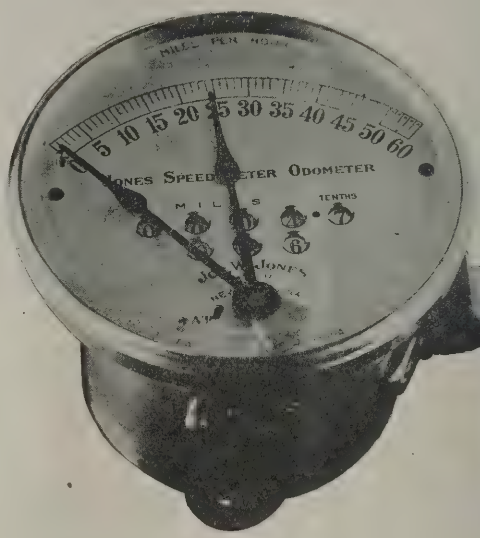
The White Company considers itself under some obligations to put this road information into the hands of the motoring public, for the reason that most of the pioneer tours into the South have been made by owners of White machines. The most extensive tour in this region was made in March, 1905, by Mr. J. S. Rowe, who traveled in his auto from Savannah, Ga., to Buffalo, N. Y. The first trip from the North to Florida was made in the autumn of 1905 by Mr. C. M. Houston, who toured in a White car from his home in Chicago, Ill., to Cocoa, Fla.

Copies of this useful route book, as well as the White Route Book No. 1, may be obtained at any of the offices of the White Company, or at the Touring Bureau of the company, 1402 Broadway, New York City.

NEW FEATURE IN SPEED INDICATORS.

The speed indicating device shown in the accompanying cut is a type so well known to automobilists in general as to scarcely need any description. The 1906 model of the Jones speedometer, made by J. W. Jones, of New York, by reason of its remarkable construction and absolute accuracy, was pronounced one of the most perfect speed indicators ever placed on the market. The performance of this instrument in the Automobile Club of Great Britain and Ireland's reliability contest, in which it was the only indicating device which scored a perfect record, won for it the club's gold medal or highest award.

The 1907 models are practically the same in construction and design as those of 1906. A separate new feature, however, may be added to the 1907 instruments that will place them far in the lead of the average speedometer now being manufactured. This feature is the addition of a second or maximum hand. This second hand is not included as part of the regular model. In using two hands one is placed directly above the other as in a stop watch. The upper hand is black, the lower one red; each moves independently of the other. The black hand indicates the exact speed at all times, changing with every change of speed, and is permanent at that point until changed by a touch on the re-setting stem, which is provided for that purpose. If a car is traveling at 25 miles per hour, for instance, the red hand indicates 25 and stops at that point. If the car reduces its speed to 10 miles per hour, the red hand remains at 25, the black one returning to 10.



SPEEDOMETER, SHOWING NEW MAXIMUM HAND FEATURE.

If an officer should signal the motorist to stop while the car is traveling at, say, 12 miles per hour, by a slight pressure on the button the red hand instantly flashes to the speed at which the car is going and remains there—it does not return to zero. This is proof positive that the speed limit has not been exceeded.

The second or red hand will also prove invaluable to manufacturers for "tryouts." Cars are frequently sold to enthusiasts on a guarantee that they will attain a certain speed. By use of this new instrument the red hand will indicate the highest speed and stop at that point. If at any time one should not want to use the red hand, by a simple turn of the re-setting stem it is made possible for both hands to move together.

The 1907 models retain the odometer register, both trip and distance. The former registers distance to 100 miles, the latter to 10,000 miles. The "trip" is provided with an instantaneous re-setting stem—said to be an exclusive feature of these instruments.

AUTOMOBILE SPEED INDICATING DEVICE.

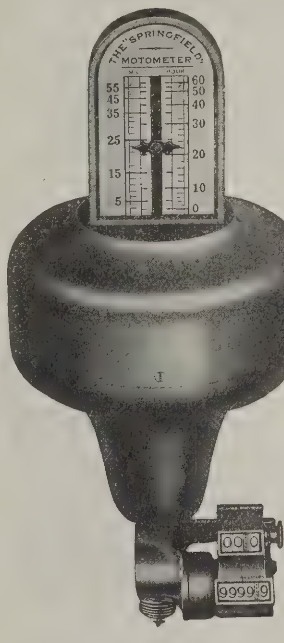
The most notable characteristic of the motor car is its speed. No other factor is so directly responsible for the immense popularity of automobiling and the consequent marvelous development of the automobile industry. The sensation of smooth, rapid motion constitutes the great charm of driving or riding in a motor car. Not every automobilist is addicted to constant overspeeding, but, in differing measure, all enjoy a fast run under pleasing conditions.

The natural outcome of this is a demand for some accurate and convenient means of determining at all times the speed at which the car is going. To meet this demand various instruments have been devised and put upon the market. The standard and accepted type of a speedometer requires of the instrument that it shall indicate continuously and accurately the speed at which the car is traveling, and the distance covered. Speed must be easily and instantly readable from the speedometer dial, in addition to which the instrument should possess an odometer dial showing the accumulative mileage and a smaller dial registering a sufficient amount of mileage to cover the average trip. The smaller dial must be returnable to zero from any point attained, so that a new trip record may be commenced at any time.

To produce these results, widely differing operative principles have been adopted, displaying varying degrees of merit. The controlling principle of the motometer shown herewith is centrifugal force, which by many is considered the most powerful, direct and exact force available for the measurement of automobile speed. Through the medium of a ball governor every variation of speed is directly recorded by the indicator on the vertical dial. The indicator is moved to its place on the dial (according to the speed of the car) and held there with a force of several pounds, insuring the perfect steadiness of the indicator over the roughest roads.

This motometer is of the standard form of automobile speed indicators in which the instrument itself is attached to the dashboard and is driven through the medium of a flexible shaft from one of the front wheels of the car. A series of gears is made, adapting the instrument to any standard size wheel, American or European. The change is easily and quickly effected, usually by means of the small gear only. The entire governor mechanism is constructed from steel, and all moving parts are perfectly balanced. The bearings are carefully hardened and entirely self-lubricating. The attaching bracket at the driving end of the shaft contains a valuable improvement in the way of a safety device. By the action of this device a stone or any hard substance may pass through the gears without deranging or damaging the gears or their fittings. The pinion is merely thrown out sufficiently to allow the passage of the intruding substance.

The odometer is of the standard Veeder type, used all over the world, which registers the distance traveled on total and trip dials, the latter being of the set-back type. By reason of the abundant motive force operating the moving parts of the motometer, it has been possible for the manufacturers, the R. H. Smith Manufacturing Company, Springfield, Mass., to make all parts large and strong without affecting its delicacy or accuracy of action. In appearance, durability and efficiency in operation it is said to be unexcelled by any other speed indicator now on the market, and both the foreign and domestic demand for it is very large.



AUTOMOBILE SPEEDOMETER.

In reading the motometer, readings for speed are taken from the vertical dial, which is graduated very plainly in miles and marked in prominent figures at intervals of five miles. The cumulative season's mileage is registered on the lower dial of the odometer to 9999 9-10 miles, all figures shifting to zero on the next tenth of a mile. The miles are indicated in black figures, and the tenths of miles in red figures. The trip mileage is similarly registered on the upper dial of the odometer to 99 9-10 miles. This dial may be set back to zero at any time by means of the knob on the end of the odometer.

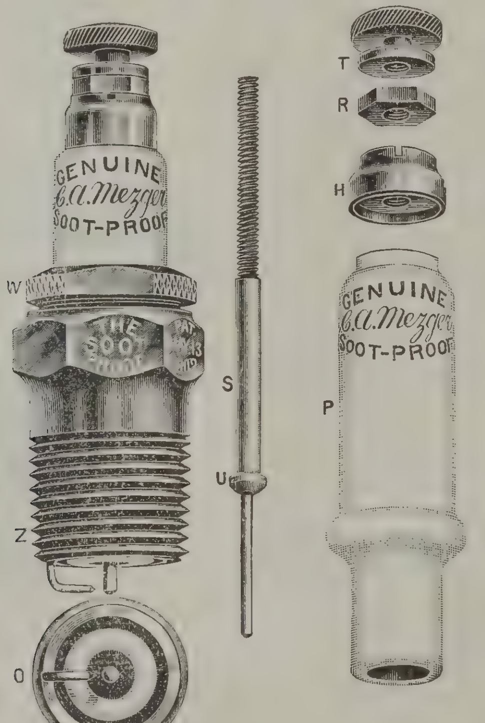
This instrument is made in two styles. For domestic trade and for export trade in such countries as use the English mile it is made to register speeds from 1 to 60 miles. For the balance of the export trade it is made with dial graduated in kilometers from 1 to 100. On this pattern the odometer also registers kilometers.

American shoe machinery is steadily finding new markets abroad. During the year 1906 the exports thereof amounted to $1,470,900.

SOOT-PROOF SPARK PLUG FOR MOTOR CARS.

Much of the ignition trouble which owners of motor vehicles experience could undoubtedly be overcome if proper means were adopted to take care of the soot deposit, which necessarily results in engines where an excess of lubricating oil is used. The illustration herewith represents a soot-proof plug which has proven wonderfully efficient in performing the work for which it was designed, and over half a million of them are said to be now in use.

The device is self cleaning, it will not short circuit, and never fails to spark. In proof of this latter contention, it is stated that if the porcelain is coated with carbon and held in a gas jet, or coated with both oil and carbon and inserted in a motor, the latter can be started with the same ease as with a clean plug, and after the motor is operated for a short time the plug will be found perfectly clean—the carbon deposit having been burned off. The reason for this is that the plugs have a large surface of insulating material—two inches between the outer shell and the center spindle—and it is easier for electricity to jump a thirty-second of an inch air space than to jump through an inch of soot. That is why short circuiting is impossible and the spark always jumps.



SPARK PLUG AND ITS VARIOUS PARTS.

The insulator is a single, large, strong, hand turned porcelain, same having been found to be superior to mica, lava, stone or any other known material, because it is non-absorbent, has high insulating qualities and will not disintegrate in hot gases. Mica is not a solid mass, but is pressed together of thin layers and under intense heat these layers separate, which causes carbon deposits and eventually short circuits. This soot-proof plug has substantial nickel spark points and it is practically impossible for oil to remain fixed across the gap. The plug is manufactured by C. A. Mezger, Incorporated, and the National Sales Corporation, New York City, have the agency for its sale.

It is claimed that nearly ninety per cent. of the motor car victories in America, whether track races, hill climbs, road races, endurance contests or reliability trials, were won by cars using these soot-proof plugs. They were also used on the winning car that was awarded the gold medal in the Six Day National Economy Test for having the least ignition trouble.

OIL AND GREASE GUNS FOR AUTOMOBILES.

The market abounds with oiling guns of different styles designed to take care of lubrication questions in automobiles, but not all of these mechanical devices are adapted to the successful fulfillment of every requirement demanded of this class of equipment. Many of them are so constructed that they will not with facility handle all kinds of oils and greases, nor perform with ease and rapidity the work required of them. Not to mention the time when some part of a machine fails to do its work, there are the various oil cups that need to be reached, gear boxes to be packed, and transmissions lubricated, besides the periodic overhaulings and cleanings that call for the handling of gasoline and kerosene, and an oiler that is capable of meeting these requirements and all other emergencies is of appreciable value to the automobilist.

An illustration is shown herewith of an oil gun which is said to be one of the handiest and most efficient devices of the kind now in use. Its construction is said to be as perfect as it is possible to make an instrument of this kind. It is made entirely of steel, and every part has been worked out with the most painstaking care, resulting in the production of an oiler capable of meeting every demand made upon it. The construction of the piston is an especially noteworthy feature, as it is fitted without leather, cork or other packing. It is driven forward by screw motion and exerts a pressure that will handle the heaviest greases.

The makers, the Randall-Faichney Company, Boston, Mass., manufacture these guns in a variety of styles, making a tip for every possible requirement. With the use of these devices the most unhandy places are readily accessible, and they are adapted to handle lubricants of every description. They are non-leakable, never get out of order, and can easily be manipulated with one hand.

OILING GUN.

AUTOMOBILE LUBRICATION.

A neat and useful little booklet, dealing with automobile lubrication, has just been issued by Adam Cook's Sons, New York city, the well known makers of the lubricating compound known as "Albany" grease.

The booklet consists of sixteen pages, with an attractive cover in two colors, and the text is interspersed with drawings showing just how Albany grease is applied in packing compression cups, transmission gears, etc. Typographically the booklet is very attractive, and the text contains information which will be received with interest by every one who appreciates what an important feature lubrication has become in the economical and smooth running of a motor car. The superiority of Albany grease for this purpose is thoroughly demonstrated, and helpful instructions are given for the lubrication of all the various parts of the machine where reduced friction means power gained. The lubricant which this concern puts out has become very generally adopted, owing to its economy and high efficiency. It is always uniform in quality, will not drip, gum, freeze or leave a sediment, and lubricates only when the machine is in operation.

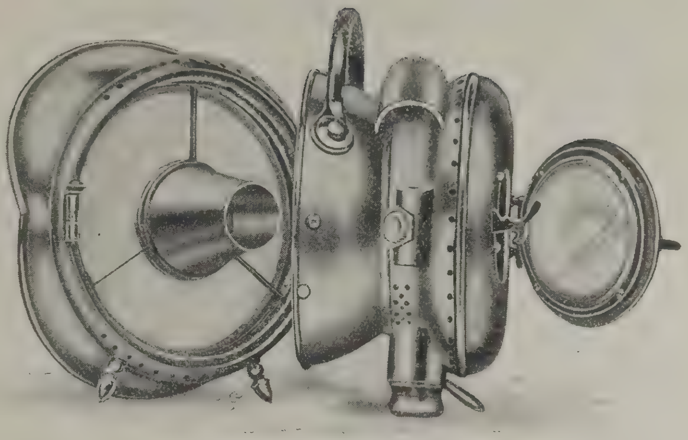
The booklet gives considerable other information of usefulness to motorists, and anyone interested may obtain a copy of same by addressing the above concern at 313 West street, New York.

GAS LAMP FOR AUTOMOBILES.

The auto lamp shown in the accompanying illustrations is proving to be one of the most satisfying devices of the kind now being manufactured. It embodies some unusual features of merit, being built on a new scientific principle quite unlike anything of the kind heretofore produced, and its high efficiency in operation, together with its handsome appearance, has won for it wide popularity among automobilists.

It is original and striking in design, and its mechanical construction is of the very best. It is made of extra heavy gauge brass throughout, and is solderless. All parts are mechanically made, the hinges solidly built, and the lamp is equipped with a back door. This latter feature is a most important one, as this small door overcomes the obvious objection of having the rear part of the lamp open in its entirety.

"PHŒBUS" AUTO. LAMP.


VIEW SHOWING LAMP OPEN.

The lamp is styled by its makers, the Manhattan Screw and Stamping Works, of New York city, the "Phœbus" Model A. In operation it produces a light of great power and brilliancy, a strong, steady light being thrown a distance of 300 yards, while the reflector and outside hood, which is plated and highly polished, lights up objects in the vicinity of the car.

It is equipped with two condensing lenses, one in front and one in the rear, both being carefully focused, and an aluminum reducing cone is inserted between the two lenses, converging the rays of light from the rear lens, thus producing the much desired searchlight effect in this type of lamp, also throwing the light a distance of no less than 300 yards beyond. The lenses are fastened very securely by screws, and so arranged that they may be easily removed and replacd without any trouble.

In the gas reservoir there is an arrangement whereby the fine particles of carbide dust are separated from the gas before it enters the burner, thus preventing any chance of the burner clogging.

The above lamp is only one of the many lamps and other automobile accessories put out by this concern. They manufacture a complete line of supplies, including gas generators, exhaust horns, flexible tubing, tire holders, oil guns, pumps, etc., and their various products are extensively used both in this and foreign countries.

The imports of American leather into the United Kingdom are still on the increase, amounting, during the first eight months of 1906, to $12,593,600 in a total import of $31,992,200. This is an increase in the imports of American leather of $2,936,300 as compared with the first eight months of 1905, and of $823,800 as compared with the first three months of 1904. The countries from which the imports of leather manufactures were imported during the three periods are not given in the official returns from which the leather statistics were taken.

NEW DESIGN OF AUTO RUNABOUT.

Next to the touring car, there is no form of auto vehicle in more popular demand than the runabout. Being lighter and less complicated, these little cars are for many purposes more efficient and reliable than the touring car, and having the additional advantage of being more moderate in cost they naturally appeal to a very large number of auto enthusiasts.

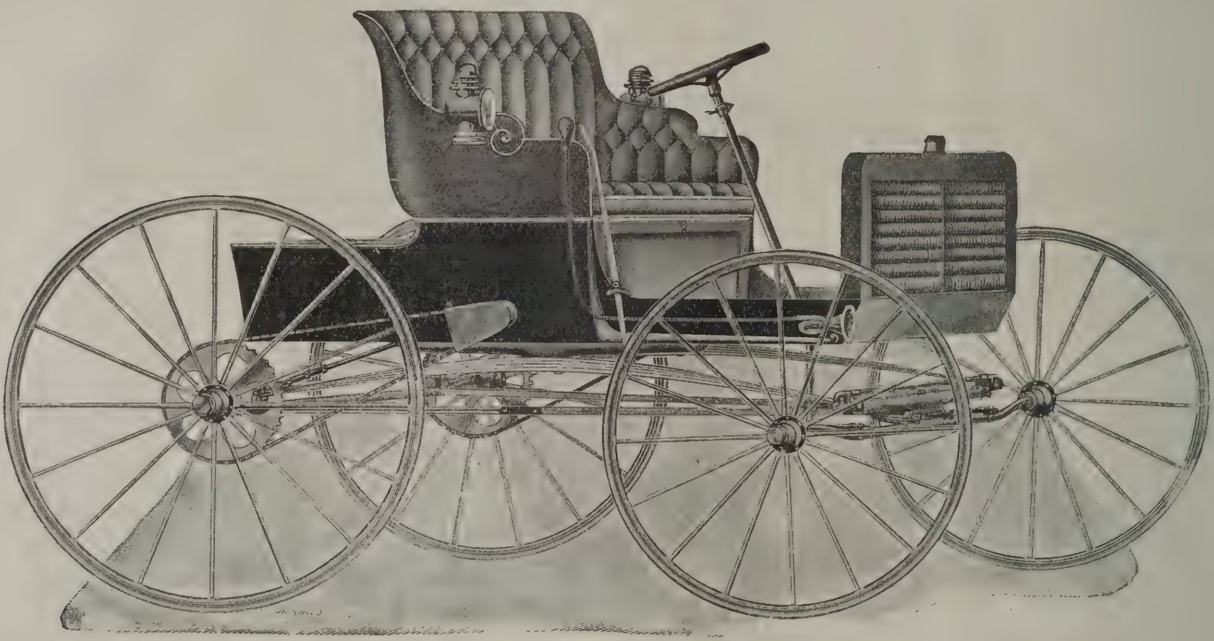
One of the season's most popular runabouts is illustrated herewith. It is a very practical and serviceable car, and represents the most improved ideas in motor car construction, its makers, the Schacht Manufacturing Company, of Cincinnati, Ohio, being one of the oldest and largest manufacturers of auto vehicles in the United States. In designing the car it was the aim of the manufacturers to make it as simple and free from complicated mechanism as possible. They have eliminated the use of any gear or clutch, all speeds being controlled by one lever, which shifts the sliding wheel onto the disc, giving any speed desired without the annoyance of changing or risk of stripping any gears. The machine is said to possess more power than necessary for its weight and light draft, and is especially adapted to hilly and rough country, the consumption of gasoline and oil being reduced to a minimum.

All working parts are contained in the body of the car, free from dust and dirt, and are readily accessible from above. The machine has plenty of road clearance, making travel through muddy or sandy roads possible without interference in any way. One of the important features of the car is the cushion rubber tires, which are said to be absolutely puncture proof and of such perfect construction that it is practically impossible for the owner of the vehicle to ever be annoyed with tire troubles of any nature.

In operation the machine is claimed to be as silent as an electric vehicle, and its large Concord springs and cushion tired wheels make the car easier than when using pneumatic tires. The ball bearing wheels and the Timken roller bearings on the countershaft reduce the draft fully 50 per cent., adding greatly to the motive power. The car is equally adapted to city or country use, and does not cost as much as a horse and buggy to maintain.

The engine is the double opposed cylinder type, of 8 to 10 horse power. The cylinders are water jacketed and cast in one piece to prevent blowing out of gaskets and prevent leakages. All parts are made interchangeable. The differential is a heavy pattern with spur gears mounted on the countershaft, with sliding friction wheel, which gives any speed desired, also reverse speed. Ignition is of the jump spark style, having regular type spark coils with dry or storage batteries. The radiator holds five gallons of water, which is circulated freely by pump connected directly on the engine shaft, and the engine is kept perfectly cool at all speeds. The muffler, which is a large one, is absolutely silent, and is so constructed that it avoids back pressure and increases the power.

The steering is done by a hand wheel operated with a large gear on the front axle and pinion on the steering post. The two powerful band brakes on the countershaft are controlled by one foot lever. The body of the car is black, and the running gear is painted carmine or any color desired. The vehicle weighs 500 pounds, and is capable of attaining a speed as high as 30 miles an hour.



EIGHT TO TEN HORSE POWER AUTOMOBILE RUNABOUT.

The exports of American made oilcloth are steadily increasing. In 1906 they represented a value of $309,363.

A PRACTICAL MOTOR CAR.

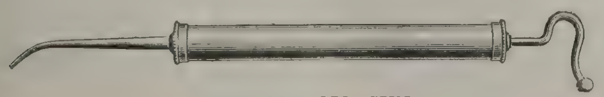
A large percentage of the expense and worry in the operating of any automobile comes from bad valves and complicated mechanism. To overcome difficulties which may arise from this source a St. Louis, Mo., company is producing an automobile, the engine of which has no valves or cams, and not a single spring. The car has many other unusual features that have helped to place it high in favor with auto enthusiasts.

It is of the friction drive type, and is constructed along lines that combine simplicity with strength and durability. It has been found to be useful and practical under the most adverse weather and road conditions, being capable of fording streams, climbing hills, and pulling through mud and sand. Great driving power is obtained through the friction disc transmission. The power is transmitted from the disc attached to the flywheel, through a 15 inch contact wheel, to the rear wheels by means of a single chain drive. The contact wheel is shod with a special fibroid possessing a great degree of adhesion. The contact is regulated by moving the contact wheel forward or backward by means of a ratchet foot lever. A roller bearing thrust is used behind the fly to take up the end thrust. The many vibrations of speed are regulated by a hand lever, and by simply shifting the transmission disc across the face of the flywheel the reverse is accomplished.

AUTOMOBILE BUGGY.

The engine is distinguished for its simplicity. It is a two cycle, single cylinder, water cooled gasoline engine, and will develop 4 horse power. The automobile is built like a buggy for any country or city road, and is capable of any speed up to twenty miles per hour, forward and reverse. The tires are of steel, and the wheels may be had any size ordered. If desired, rubber tires may be had.

SOME USEFUL AUTO ACCESSORIES.



IMPROVED OIL GUN.

STEEL PUMP OILER.

The devices illustrated herewith are some of the newest accessories in motor car equipment. All are characterized by simplicity of construction, durability, reliability and high efficiency in operation. The oil gun is an especially well constructed device and one that is adapted for a variety of purposes. It can be used anywhere to oil machinery, but it is largely used by the automobile trade. It will suck oil from a drip pan or from a can, and will handle thin or heavy oils with equal efficiency. It is equipped with a double plunger. One set pulls up the oil and the other forces it out. The instrument will not leak or become clogged, and is said to never get out of order. The manufacturers carry in stock 8 and 10 inch lengths, 1⅛ inches in diameter, and 6 inch lengths, 1¼ or 1½ inches in diameter. The steel pump oiler shown in cut is a comparatively new design, and one that is finding much favor with automobilists all over the country. It is made of steel, and has a seamless steel cup bottom. The can is so constructed that it can easily be taken apart, so that the valves and pump can be inspected. The pump is inside, out of the way, and the entire mechanism of the can is said to be as perfect as could be desired. The threads are of standard size, so that the nozzles can be changed to other lengths. The manufacturers, the Noera Manufacturing Company, Waterbury, Conn., make several sizes of these oilers, ranging in capacity from one pint to two quarts.

The foot pumps made by this company are also widely used. They are pleasing in design, take up little room, and work effectively and easily. They are finely nickel plated, have a seamless barrel, and are so strongly made that it is said to be impossible for the base to ever pull out.

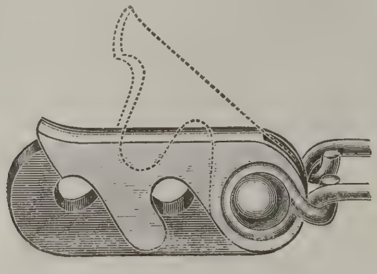
FOOT PUMP.

The American vice-consul at Seville furnishes recently published statistics in relation to the world's production of honey, which designates Spain as second in the supply of that product, the total number of her beehives being 1,690,000, and the quota of honey furnished by her 19,000 tons out of 80,000, the world's yield. Germany, with 2,000,000 beehives, produced 20,000 tons of honey, a larger quantity than all other countries. Austria, ranking third, produced 18,000 tons of honey; France, 10,000; Holland and Belgium, less than 2,500, and Greece, Russia and Denmark, 1,000 tons each.

Bulletin No. 139, which has just been issued by the B. F. Sturtevant Company, of Boston, Mass., in its Engineering Series, presents a full line of generating sets driven by direct connected vertical enclosed engines with forced lubrication. The published list contains fourteen sizes ranging from 3 to 50 K. W. in output; the former driven by a 3½x3 engine, and the latter by a 12x10. All of the engines were especially designed for generator driving.

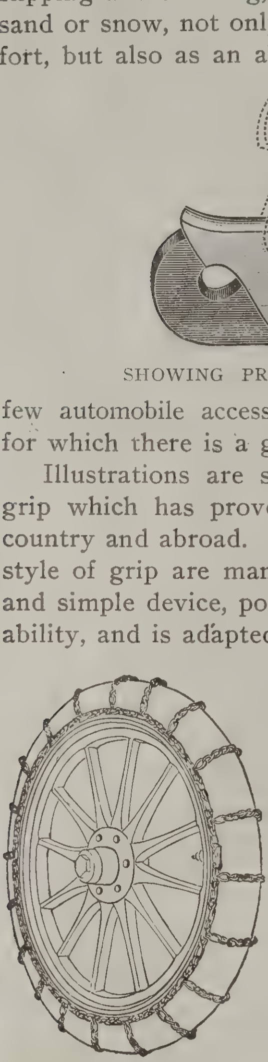
ANTI-SKIDDING DEVICE FOR AUTOMOBILES.

Autoists have come to regard devices to prevent slipping and skidding, and to furnish traction in mud, sand or snow, not only as a means to additional comfort, but also as an absolute necessity, and there are few automobile accessories now being manufactured for which there is a greater demand.



SHOWING PRINCIPLE OF OPERATION.

Illustrations are shown herewith of a chain tire grip which has proved very successful both in this country and abroad. The advantages claimed for this style of grip are many. It is a thoroughly effective and simple device, possessing great strength and durability, and is adapted for use in any and all kinds of weather conditions. Cars equipped with these grips can with ease and safety climb the steepest hills, or travel through snow, ice, mud or sand without in any way injuring the tire, as the construction of the grip is such that it affords full protection to the tire and tube.



CHAIN TIRE GRIP.

One of the advantages claimed for this form of grip are that it will not stretch, and if one or two chains should be accidentally broken the remainder will not be affected. The manufacturers, the Weed Chain Tire Grip Company, of New York, make this device adjustable to fit all sizes of tire, and they state that over 50,000 pairs of their grips are now in use. Aside from their positive effectiveness under all conditions, the feature that appeals strongly to the trade is the readiness with which they can be attached and removed by means of a connecting hook, and the small space they occupy when not in use.

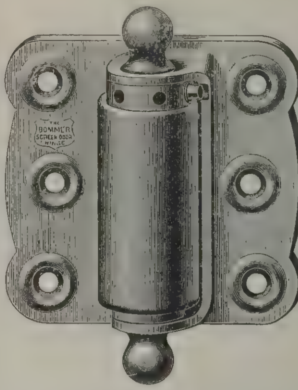
To facilitate the handling of its large and rapidly growing trade, the Swinehart Clincher Tire and Rubber Company, Akron, Ohio, has recently made some important changes in its plant. Extensive improvements have been made, and machinery added that will increase the company's output by at least 50 per cent. The solid clincher tires manufactured by this concern are now in use in nearly all parts of the United States, and the foreign demand for them is said to be steadily increasing.

NON-HOLDBACK SCREEN DOOR HINGE.

Bommer Brothers, Brooklyn, N. Y., the well known spring hinge manufacturers, have just placed upon the market a new line of screen door hinges which will undoubtedly find favor with a large number of users of these devices. They were designed to fill a particular want for such a hinge, and in construction are said to be different from anything in this line now being manufactured.

They have an adjustable tension and covered springs, and are well adapted for high class work where appearance and endurance are requisite qualities. They are pleasing in design and finish, are substantially made, and very easy of adjustment and operation.

To meet varied requirements they are made in a variety of styles; steel, bronze or brass may be had, as desired. The practicability and usefulness of these hinges have already been demonstrated in numerous instances, and the manufacturers are anticipating a very large foreign and domestic demand for them.



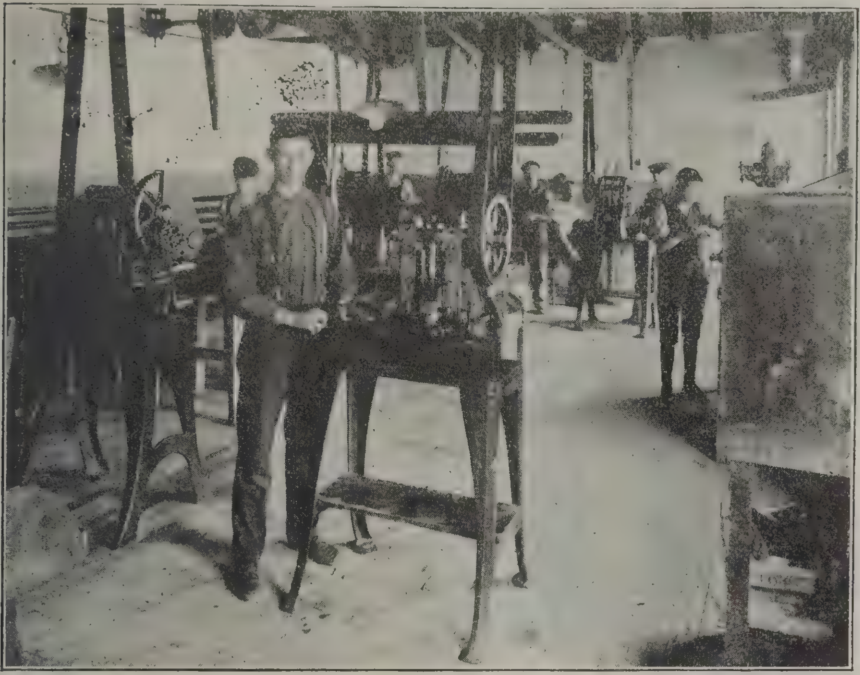
SCREEN DOOR HINGE.

In addition to its numerous catalogues, the Allis-Chalmers Company, Milwaukee, Wis., has adopted the system of issuing separate bulletins, each of which covers some special machine of the company's manufacture and contains a complete description of its construction and its uses. Within the past sixteen months over eighty of these publications have appeared, which in itself is an indication of the variety and extent of this concern's products. The line manufactured includes all kinds of electrical, flour mill, power, pumping, sawmill, and mining and crushing machinery. When the company's list of bulletins is completed their number will be considerably in excess of one hundred.

The Hathorn Foundry & Machine Company, Grinnell, Iowa, has, on account of increasing business, found it expedient to remove its plant to Chicago, where better facilities for handling its output may be obtained. The company is now located at No. 1206 North Seventy-first avenue, Chicago, Ill.

THE MANUFACTURE OF CARTRIDGES.

Perhaps no other article that may be classed in the category of sporting goods is so vitally interesting to the retailers and jobbers engaged in that line as ammunition, since it is one of the necessary lines that every sporting goods dealer must carry. Throughout various parts of America there are many large plants devoted exclusively to the manufacture of this product in its various forms, and to those of our readers who have never enjoyed the novel experience of a visit to one of these establishments a description of the methods and processes used in the manufacture of cartridges will undoubtedly prove interesting.

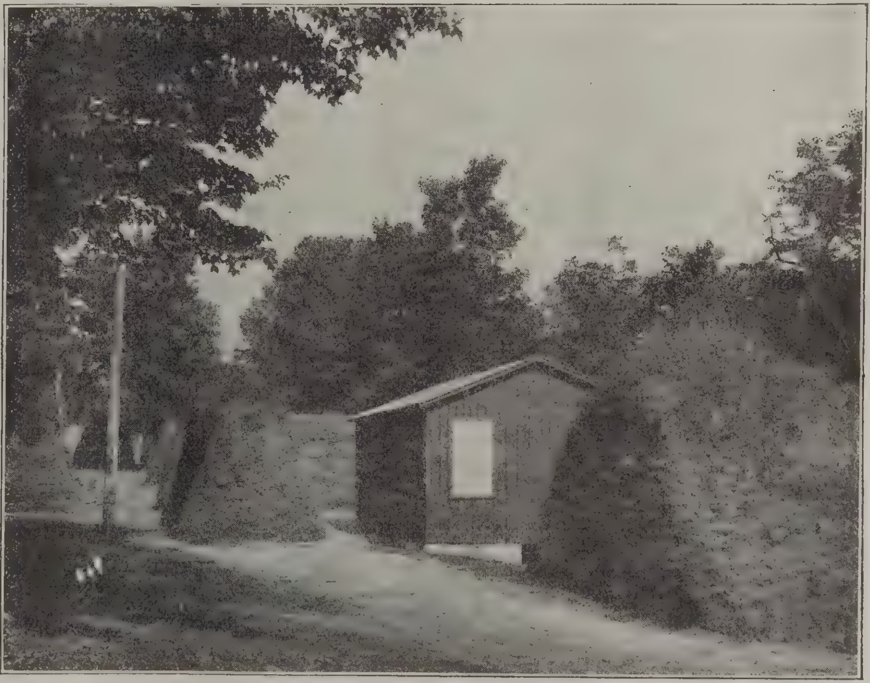


MACHINES FOR MAKING SHOT SHELL PRIMERS.

As a typical example of a thoroughly modern manufacturing plant, we have chosen for illustration the factory of the well known Dominion Cartridge Company, Limited, of Montreal, Canada. Besides a close alliance with the two powder plants in Canada, their intimate relations with the Nobel's Explosives Company, Glasgow, Scotland, which is understood to be the largest and most experienced concern of that nature in the world, makes their position a fortunate one. They are one of the few ammunition makers who make their own powder and primers.

Just how well equipped they are for producing ammunition of the highest grade may best be judged from a brief account of their plant near Brownsburg, which is about 60 miles from Montreal, and the various manufacturing processes necessary to convert the raw materials into finished products. The site of the works comprises 200 acres of land, and a large stream flows through the reservation. This stream has been dammed, and with the natural falls below the artificial obstruction, which have a drop of 50 feet, furnishes ample water power.

Only one visit to this plant is necessary to show that the work in turning out powder and ammunition has been systematized to a rare degree; the inspection department has been developed to a stage of infallibility and exactitude that ordinarily would seem impossible in connection with so large an industry. Expert workmen and an equipment that includes all the latest electrical and mechanical apparatus for taking velocities, pressures and other tests have resulted in the adoption of definite and high standards that are steadfastly adhered to. A certain proportion of each day's work is tested in every detail at different



HOW EXPLOSIONS ARE KEPT FROM SPREADING.

stages of manufacture, also just before packing, and there is no possibility for defective goods to pass on to the market.

Rifle cartridges and metallic shells are made from sheet metal, which is usually special grades of copper, spelter, etc., combined in most exact proportions. From these sheets, which must be rolled with the greatest accuracy and care, circular disks are punched and at the same time formed into shallow cups, which are drawn out to the required length and diameter by being forced through smaller dies. In the ordinary sizes from two to six drawings are necessary, and between each drawing the shell must be annealed, pickled and dried. Following the drawing process, the shells are trimmed at the mouth, and, if for rim fire cartridges, are then ready for heading; if they are for center fire cartridges, a hole is first inserted in the end to start the primer pocket. They are then trimmed on the sides of the head and underneath, and again at the mouth, for the reason that the heading slightly alters the length. If the cartridge is to be what is term "bottle-necked," the metal of the shell is then annealed and reduced. After all this the shells are subjected to a final verifying operation; the primer pocket is sized, the flash hole is punched and the primer inserted. The primer cup is formed like the cartridge cup; then the charge is inserted and covered with a disk of tinfoil and finally compressed. In an ordinary primer the charge is only one-tenth grain and is composed of a number of different ingredients. The slightest variance in the proportion of these—size of grain, purity, etc.—will affect the quality of the primer, hence it will be seen that the process throughout is a very delicate one. Great attention also must be paid to the uniformity of the primer cup and temper. Rim fire cartridges are primed by spinning the mixture into the rim. All operations having to do with fulminate of mercury and primers are very hazardous, and the greatest pains must be taken to insure safety as well as accuracy. Both primers and rim fire cartridges have to be dried very carefully.

Ordinary bullets are either cast in slugs, a number at a time, or cut from wire. Different combinations of lead and tin are also used. The slugs are then swedged to exact shape and weight, thus securing uniform texture. After swedging the bullet is cannulured and greased. The quality of the lubricant is most essential, for by this the shooting qualities, fouling and other things are largely governed.

In jacketed bullets the outside shell is made by a number of operations similar to those employed with the cartridge shell. The core is swedged similarly to the ordinary bullet, inserted and then treated to a number of additional swedgings to complete it. In the making of shells for trap shooting, sheets of paper are pasted, rolled into long tubes, dipped, ironed and trimmed to proper lengths. The brass battery cups and primers are stamped out of solid sheets of metal, and then paper tubes with bases are pressed into brass heads and finally completed with primer cup and primer. Then follow the operations of the loading machines, by which the empty shells are supplied with powder wads and shot, and finally crimped and finished with automatic exactness. During all these operations frequent inspections have to be made, and tools have to be looked after regularly and gauged. The work throughout is exceedingly accurate. In some operations not more than one ten-thousandth part of an inch in variation is allowed. Much of the machinery operates at a very high speed, and it is necessary to have means at hand to discover promptly any imperfections in order to prevent waste. In most cases there is no satisfactory way of detecting an imperfection after the cartridge is finished, so that careful watch must be kept throughout all operations.

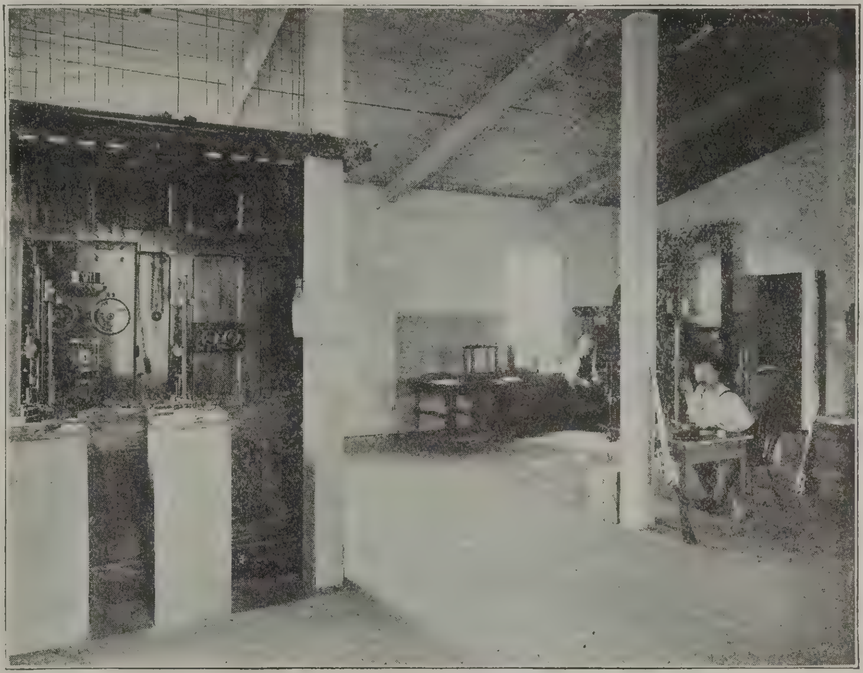
The accompanying illustrations are necessarily incomplete on account of the scattered arrangement of the plant, as it is impossible to obtain a good perspective of the many buildings which are spread over a broad territory. However, the views here shown will furnish an idea of the interior of some of them and will serve to convey a clearer meaning to the descriptive matter which follows.

In the first view is seen the machinery for making hot shell primers. There are two methods, commonly called the wet and dry, for making these parts. The dry method is used for making strong primers required for use with smokeless powder and derives its name from the fact that the explosive charge is mixed and loaded in a perfectly dry state. In the wet process, which has been longer in use, the charge is worked in a moist state, the primers being thoroughly dried out after completion. The illustration shows only the machines in which the primers are covered with tinfoil or shellac, as the case may be, and the anvils are set in and pressed down in such a manner that it is impossible for the charge to become loosened. Adjoining this room are smaller compartments, in the first of which the empty primers and anvils are shaken into plates; the plates containing the primers are then passed into a third room, where the explosive charge is put in, when it is again passed to the room in the picture. Machines which run with great rapidity then receive the plates containing the primers and anvils. The explosive mixture used is of a most violent character, and to prevent any explosion spreading from one room to another the walls are built of double thickness. Small trap doors are placed at a convenient height, through which are passed the plates of charged primers. As each plate leaves the machine it is passed to the small rooms at the end of the building, where the primers are inspected before being sent to the dry house. Even the primers made by the dry method are put in warm rooms for a period to secure absolute dryness and uniformity in ignition. The primers are then under the charge of the testing department, and no day's work is allowed to be carried to the packing or finished primer storehouses until it has been passed upon as being absolutely perfect.

The method of isolating what are known as the danger buildings, in which the fulminate of mercury and other excedingly explosive substances are manipulated, is shown in the second picture. The effect of these mounds and trees is to throw the force of the explosion straight up into the air rather than have it spread laterally in all directions, which would be the natural course. Another interesting point is the white painted windows of the nearest building, showing how the sun's rays must be kept from entering. A portion of the crimping room, where the bullets are crimped into the shells and the finished product is cleaned and packed, may be seen in the third illustration. The three machines nearest the front of the picture are at work on center-fire cartridges. On leaving the crimpers the cartridges pass through the hands of the inspectors, who carefully scrutinize them for flaws. At odd intervals during the day other inspectors come from the testing department and take the product direct from the machines to be tested. This same method of inspection is employed in all parts of the factory and absolutely prevents imperfect material from reaching the hands of the packers. A corner of the test house, which gives a good view of the Belanger chronograph, is shown in the last illustration. By means of this machine the velocity of a bullet or the charge from a shot shell is determined. The open door leads to the covered range to which the chronograph on the left of the picture is connected.

CRIMPING BULLETS INTO THE SHELLS.

It is interesting to note the different parts of the world which are represented in a single cartridge. For instance, brass—the copper comes from the Western States and the spelter from Spain; powder—the saltpetre comes from Chili and the sulphur from Sicily or Japan; the primer—the mercury is obtained from Spain, shellac from India or South America; the bullet—lead comes from Canada, Spain or England, and tin from the Straits Settlement. The wax in the lubricant is a product of Japan and Russia.

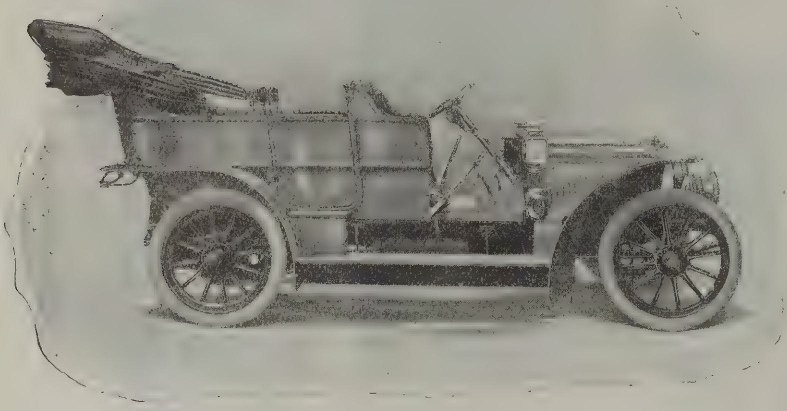


VIEW OF THE TEST HOUSE.

A line of very neat blotters has just been issued by F. W. Bird & Son, East Walpole, Mass., manufacturers of the well known Paroid roofing. The subject is "First Expedition to Cuba" and refers to a large order for Paroid just received to cover buildings at Newport News, Va., where the first expedition to Cuba recently started. This firm is continually getting out neat blotters and other interesting advertising matter, and they will be glad to place on their mailing list the name of anyone who may be interested in receiving same.

POPULAR TOURING CAR.

The motor car shown in the accompanying cut is one of the most thoroughly up-to-date and widely used machines now being manufactured. It is of the large, high-powered type, and has a four-cylinder motor, water-cooled, with double ignition system. It is equipped with four speed selective type transmission, double side chain drive, and all bearings of the transmission and wheels are of the Hess-Bright type.



SEVEN-PASSENGER MOTOR CAR.

These care are made in two sizes, 40 horse power and 60 horse power, the former with a chassis wheel base of 117 inches and the latter with a 120 inch wheel base. The wheels are 36 inches in diameter, with standard tread of 56 inches, and 10 inch road clearance.

The ignition is of the jump-spark type, with two plugs for each cylinder—a Simms-Bosch high tension magneto generating one course of electrical energy, with a Witherbee accumulator furnishing the current for the extra spark plugs.

The car is of the seven-passenger type, with handsome, graceful body lines, although the chassis are also built to receive runabout bodies or closed bodies for winter. The manufacturers of these cars, the Lozier Motor Company, of New York City, are known throughout the world for the excellence of their various products. In addition to motor cars, they manufacture a complete line of bicycles, marine gasoline engines, motor boats and launches, and they have agencies established in all parts of the world.

On the eastern and northeastern flanks of the great Bolivian tableland the rivers that form the head waters of the Amazon and River Plate systems offer great possibilities for the generation and transmission of electric power. To be of service in the principal mining centres this would mean transmission over a distance varying from 50 to 120 miles. At the present time considerable interest is being shown in this, and one survey of the rivers and possible consumption of the power has been made. According to the survey it is estimated that many thousands of horse power are available, and that for mines in the Oruro district the cost would be much less than that of the power at present in use. To put this scheme on a practical basis more careful studies are needed and a large expenditure of capital. The Vice-Consul of Oruro expresses the opinion that competent technical representatives who can supply approximate estimates and all other information might with advantage visit the country.

NEW BUCKBOARD DELIVERY WAGON.

The accompanying illustration represents a new motor car, designed for parcel delivery purposes, which possesses features of merit that will no doubt bring it into immediate popularity. It is of the buckboard type, with 4 horse power motor and friction transmission, and having extra large rear sprockets. The car is capable of great speed, and has a carrying capacity of 350 pounds, in addition to the weight of two passengers.

As will be seen, a detachable seat can be placed in the rear, making a very satisfactory four passenger pleasure car when it is not in use as a delivery wagon. Its makers, the Waltham Manufacturing Company, of Waltham, Mass., are large manufacturers of automobiles, and they make a specialty of the buckboard type. The various models of these machines are used in all parts of the world; their utility, durability and economy of operation have been thoroughly demonstrated, and in the construction of this new delivery wagon these same desirable features have been embodied. Exhaustive tests have been made, and it is estimated that one of these delivery cars will do the work of three teams. The wheel base measures 89 inches and the tread 42 inches.

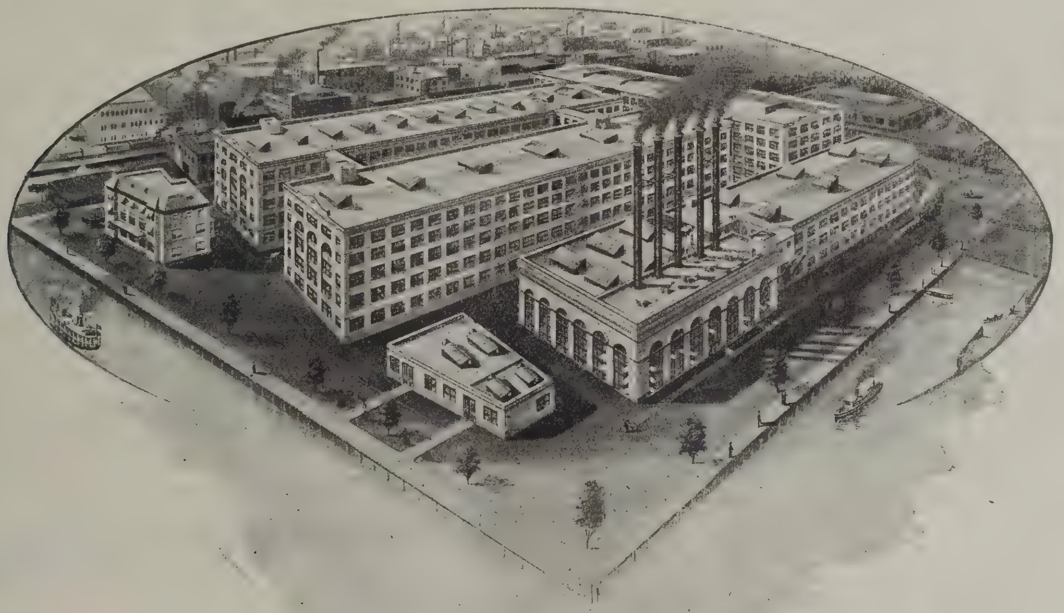
For use in wet weather a mackintosh top has been designed, and this will be furnished with the car when desired.

PARCEL DELIVERY WAGON.

A HUGE NEW RUBBER PLANT.

The completion a few months ago of the large manufacturing plant of the Morgan & Wright Company at Detroit, Mich., marked an event of much importance to the rubber industry, as this company now ranks as one of the largest manufacturers of rubber goods in the world.

The history of this concern is one of curious interest because of the fact that they were the pioneers in the manufacture of the now indispensable pneumatic tire. In 1883 Morgan & Wright occupied a single room situated on Lake street in Chicago. Here they began in a small way to manufacture mechanical rubber goods. The total volume of business transacted the first year was about $12,000. The new plant at its full productive capacity will equal that amount in one day. In 1893 the firm was incorporated, and about this time perfected and placed on the market the first double tube pneumatic bicycle tire. The superiority of this type of tire over the solid or cushion type at once became apparent, and an enormous demand grew up in an incredibly short space of time. During a single working day twelve thousand dollars' worth of these tires were turned out.



GENERAL VIEW OF THE RECENTLY COMPLETED WORKS.

The market for various kinds of tires became so great that the mechanical rubber goods business was swamped, and for a time almost entirely neglected. In 1898 the waning popularity of the bicycle enabled the firm to return to the manufacture of mechanical rubber goods, and induced them to seek new avenues of trade. During that year they began the manufacture of solid and cushion vehicle tires—a business that grew, in the course of two or three years, to more than $1,000,000 a year. The manufacture of both rubber heels and rubber horseshoe pads under their own name instead of for others was an evidence of the growing importance of this trade.

Then a new era began to dawn for the pneumatic tire business. About 1901, when the automobile was beginning to attract general attention, a series of experiments began in the manufacture of tires for this new form of vehicle. The double tube tire, originally designed for the bicycle, proved to be the progenitor of the modern perfected automobile tire. In 1904 the firm placed on the market the "Clincher" tire under their own name. A little later they made the "Perfected Dunlop" tire; and they have now placed on the market an improved solid rubber tire for commercial vehicles.

In 1904, owing to the large and rapidly increasing business, the plant was becoming expensive to operate. The buildings were leased, disjointed, and were becoming inadequate to their needs. In the late months of 1904 the advisability of removing the business to another and more favorable location was considered. The numerous advantages of Detroit, Mich., were mentioned by a number of prominent rubber goods people. Investigations were accordingly made, which resulted in Detroit being chosen as the site for the new plant. The plant is one of seventeen independent producing concerns located in the various large cities of the United States which are owned by the Rubber Goods Manufacturing Company of New York. Each of these individual units, however, is separate and distinct so far as its operation and management are concerned.

The buildings of the new factory are of white sand-lime brick, with fireproof and slow burning construction throughout. Six separate buildings compose the group devoted to manufacturing and subsidiary purposes. The seventh is designed for the exclusive use of the officers constituting the business administration. The two largest buildings run north and south, and are located on the southwest portion of the site. They are placed side by side at right angles to the river and are 60x300 feet, five stories in height. The one to the west is known as the manufactured goods building, and the other as the mill building. Extending at a right angle to these buildings is the warehouse. To the east of the mill building is located the power building. South of the latter is the rubber cement building, and upon the north is located the machine shop and hard rubber department. The main office building stands between the manufactured goods building and the river.

Power for the entire plant is developed by two 26 and 54x58 inch cross-compound condensing engines, each of 1,200 horse power. The arrangement of the various buildings composing the plant is such as to accomplish the greatest economy of power distribution and the most convenient handling of goods in process of manufacture.

Large, quick-operating freight elevators have been installed at frequent intervals along the walls of the buildings devoted to manufacturing. A narrow gauge track for factory cars has been laid wherever traffic of a heavy nature occurs between different buildings and different parts of the same floor.

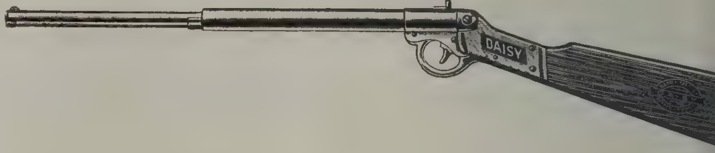
Accommodations have been provided for 3,000 employees, and, judging from the concern's growth in the past, it is altogether probable that a force closely approximating this number will be required to operate the plant within a year.

DEVELOPMENT OF THE AIR RIFLE.

The air rifle in its present perfected form owes much of its development to the ingenuity of modern inventors, although it may be said that the principle of the air gun is as old as the Romans, as similar devices, though in a crude form, have been in existence for centuries. From time immemorial it has been the delight of boys to mimic, in their juvenile way, the habits and sports of full grown men, and in no respect does this propensity more strongly assert itself than in the alacrity with which they take to every form of shooting device, the desire to possess which very early manifests itself in almost every boy.

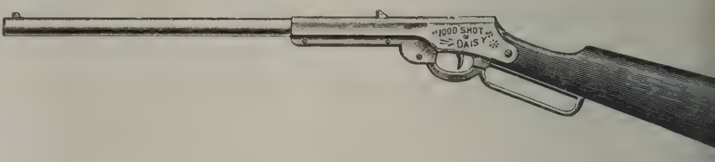
TWENTIETH CENTURY "TAKE DOWN."

It was the recognition of this basic principle and its application to the designing and making of air rifles which has brought the products of some of our leading manufacturers into such universal prominence. The progress of the air rifle has been one of steady and lasting growth, and its manufacture has now become an important industry, swelling not inconsiderably the export statistics of America, and exercising worldwide influence in education and in sport. It is now a recognized fact that the air rifle serves as more than a toy. Its value to any nation is of considerable moment, since it encourages good markmanship, rifle drill and, above all, a spirit of patriotism. A boy with an air rifle is constantly shooting at something; he becomes alert and watchful, and acquires the habit of aim and precision. When he grows to manhood, if he should be called upon to fight for his native land, he displays none of the awkwardness and poor markmanship which characterize the raw recruit whose youth has been spent in ignorance of air guns.



"TAKE DOWN" REPEATER.

The development of the air rifle in America has been one of steady advancement, important improvements in its construction, appearance and efficiency being made from time to time, until the products turned out today by reliable manufacturers are as perfect as could be desired.



ONE THOUSAND SHOT AIR RIFLE.

One of the largest and most important air rifle centers in this country is in Plymouth, Mich., where is located the large plant of the Daisy Manufacturing Company, which has in the fifteen years it has been in business established an enviable reputation for the excellence of its products, which are now found in practically every country in the world. Its gun-like looks and close resemblance to the modern military rifle, as well as its true shooting qualities, general efficiency and durability, are the qualities which have won for it the universal popularity it enjoys.

The plant of the company is equipped with every facility in the way of improved machinery, etc., for turning out perfect products, every part of the rifle being constructed in the factory of the concern. Every rifle from its journey from raw material to finished product passes through a large number of hands and under the shaping and moulding influence of specially made machinery. By the adoption of darts, which the company makes expressly for use in its air rifles, they are admirably adapted for indoor target practice.

The rifles are made of steel, handsomely nickel plated, and all parts are interchangeable. The stock is of genuine black walnut, highly polished. In the illustrations herewith are shown some of the company's most popular models. The "take-down" repeater, shown in second cut, is an especially well designed rifle, accurate in shooting and so strong that it will stand almost any severity of a boy's hard usage. The repeating attachment is extremely simple, and both the magazine and shooting barrel can be easily removed. The gun measures 31 inches in length and weighs 1 pound 14 ounces. The magazine holds 48 air rifle shot.

The "Twentieth Century Take-Down" is a strong and accurate shooter, and is a favorite with boys of all ages. The shooting barrel is so arranged that either shot or darts can be used. By removing two screws the rifle can be taken apart and packed in small space for convenience in carrying or shipping. It measures 31 inches in length and weighs 1 pound 13 ounces.

The 1,000 shot air rifle is a magazine gun with lever action. It shoots accurately and with great force. The magazine holds 1,000 BB shot and loads automatically. The working parts of the rifle are made of steel and brass, and are so arranged that anyone can take the gun apart and put it together again. It is very gunlike in appearance, and is a favorite wherever it has been introduced. In length it measures 36 inches and weighs 3 pounds. The company also makes this style of rifle in a size 4 inches shorter, the magazine holding 500 BB shot. This is a rifle which has just been brought out to meet the demand for a strictly high grade automatic repeater that can be handled by boys for whom the 1,000-shot rifle is too large. It is 32 inches in length and weighs slightly over 2 pounds.

CASH REGISTERS FOR DOMESTIC AND EXPORT USE.

Every merchant recognizes the need of having a system that will give him an accurate check on each day's transactions, and the simpler the method the better it serves his purpose. Of the many inventions which manufacturers have produced to aid the merchant in systematizing his work, none have more successfully filled this requirement than the cash register. The excellent work of which these machines are capable, their simplicity, and the ease with which they are operated, render them one of the most satisfactory methods that can be adopted for the accurate accounting of business transactions, and it is exceptional indeed to find the merchant who does not number in his store equipment one or more of these useful devices.

The accompanying illustration represents one of the most improved cash registers now being manufactured, and in both this and foreign countries it has been widely adopted. It is exceptionally well built, possessing many features of superiority over the average cash register, and it has the added advantage of being moderate in cost.

With the aid of this device the merchant has a check on each and every transaction of the day; all cash taken in or paid out is accurately recorded, charge sales noted, and all mistakes detected. The register is very simple in construction, and is said to have fewer parts than any machine of its capacity. Every feature is up to date, and the machine is built to last a business lifetime. Owing to its simplicity and the positive action of its parts it is impossible for it to get out of order or fail to act promptly. The register is made by the Continental Cash Register Company, and the export agent and distributer for same is A. A. Levy, 260 West Broadway, New York City.

CASH REGISTER.

The machine is very easy to manipulate. There are no push buttons or drawer levers to operate, the work being accomplished by simply pressing the key or keys required to make the sale. The workmanship and finish on the register is of the very best. The frame is of oak, and there is a marble ledge over the money drawer. The case is handsomely nickel plated, and it can also be had in oxidized and gold finish. The register is furnished with a 1 cent or 5 cent keyboard, as may be desired, and it is also made to apply to the currency or moneys of any foreign nation. The dimensions of the machine are: 18¼ inches wide, 12 inches deep on sides, and 22½ inches high.

The manufacturers are also making a machine of fifteen keys, and will shortly have one with nine keys. The one shown here is equipped with twenty-five keys.

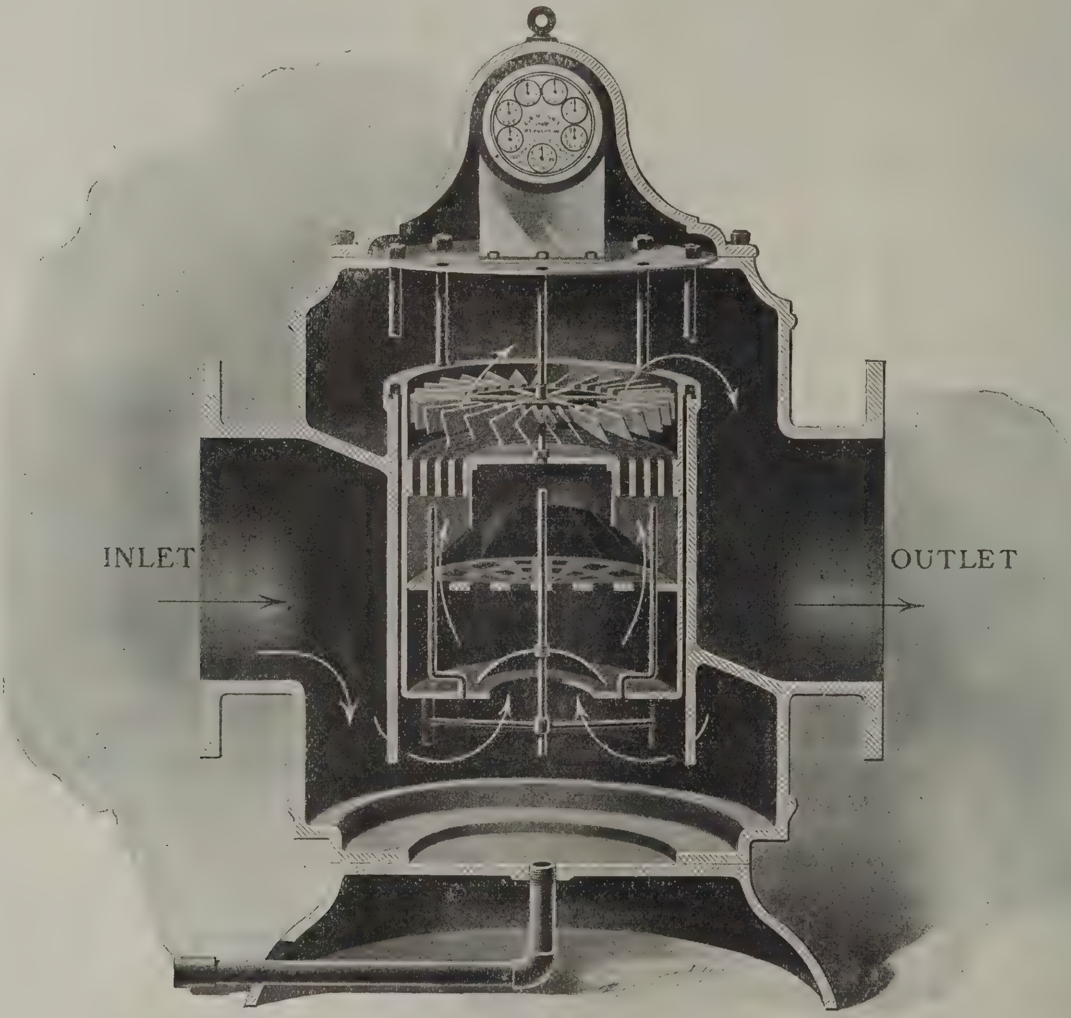
During the year 1906 the exports of boots and shoes aggregated in value $9,653,751. Our largest customers were the West Indies, Great Britain, Canada, Mexico, Australasia and Central America.

ROTARY STATION METER.

The wide utilization of gas for both fuel and light now prevailing in this country and in Europe may be attributed in a great measure to new methods, improved apparatus and superior appliances which have been introduced during the past decade. Marvelous developments in the construction, as well as in the operation, of apparatus for the production of coal gas, water gas and oil gas, have resulted within a brief period.

The developments which have so rapidly taken place in the distribution of gas have naturally had a tendency to greatly increase the demand for station meters. The rotary station meter shown in the accompanying illustration was designed to meet the demand for a reliable and compact type of meter, and one less costly than the old style of meter in use so many years. It is the invention of Thomas Thorp, of Manchester, England, who has given to the world of scientific research many useful inventions. These meters are in use and applicable for the measurement of all gases, viz., coal gas, water gas, coal-water gas, oil gas, producer gas, coke-oven gas, blast furnace gas; for the measurement of air for oxide revivification in gas works; for air compressing machinery, regenerative furnace operations, etc.

The meter is very compact, requiring about one-tenth the space of the old style meter; all parts are interchangeable, and it is practically frictionless. It is peculiarly adapted to high pressure work, as it is equally accurate in its measurement of high as well as low pressures. For high pressure work the meter is so arranged that the volume of gas is as accurately registered as though taken at atmospheric pressure, notwithstanding widely varying pressures.



ROTARY STATION METER, SECTIONAL VIEW.

The minimum measuring capacity of a rotary station meter is one-tenth that of its maximum, and this range is practically sufficient, since a meter installed, say, for example, to measure an hourly make of 100,000 cubic feet (or any other quantity), is rarely called upon to measure so small a quantity as 10,000 cubic feet per hour.

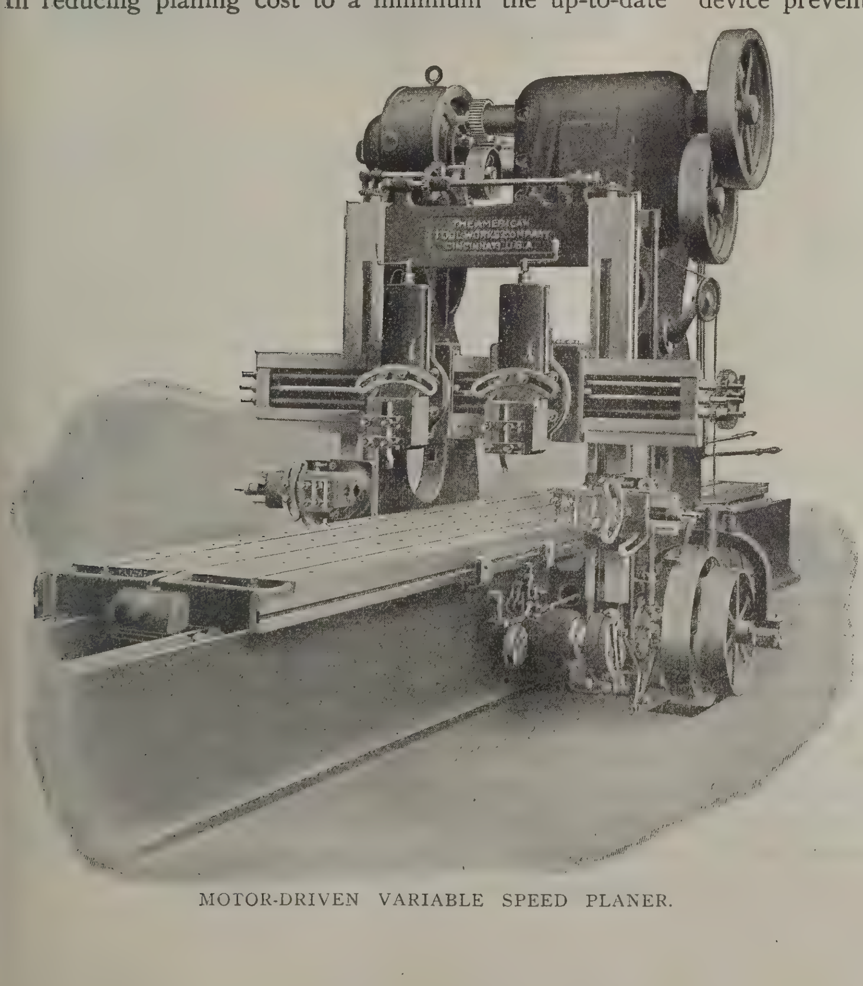
This device is in no sense a proportional meter, since the whole of the gas passes through the measuring mechanism, and it performs accurately all the functions of the old style station meter, not only with steady flows but with erratic and varying flows as well.

There is nothing complex either in the construction or operation of the meter. Its applicability enables its use for the measurement of all gases, whether purified or unpurified. In a combined coal and water gas works separate measurement of the water gas make is most important, and the rotary station meter affords an inexpensive means for determining this.

In a large coal gas works the various retort houses may be sectionalized, and the engineer can satisfy himself as to the relative merits and efficiency of different settings, while always having the means of checking his daily returns and make. In medium sized and small works one or more beds of retorts can be sectionalized and utilized as a most efficient coal testing plant, the results having the advantage of being arrived at under ordinary working conditions. Unpurified gas will not appreciably affect the working of the meter. For subdividing or measuring district send-outs in distribution, these meters are of the greatest value. In setting them no special valves or by-passes are required, and the working parts may be easily removed without interfering with the gas supply.

VARIABLE SPEED PLANERS.

The necessity for "reduction in shop cost," which appears to have become quite marked of late, and in consequence has created a strong demand for machine tools to meet these requirements, has led the American Tool Works Company, Nos. 600 to 650 Culvert street, Cincinnati, Ohio, to develop a line of variable speed planers. In reducing planing cost to a minimum the up-to-date plant manager often requires variable cutting speeds to cover different classes of work. The planers described here are built to suit all these requirements. The manufacturers make two types of these variable speed planers —one with four cutting speeds and the other with two—each type having a constant speed return of the platen which is greatly in excess of its highest cutting speed.



MOTOR-DRIVEN VARIABLE SPEED PLANER.

The four-cutting speed planer is either belt or motor driven. The speeds are obtained through a speed box, in the designing of which the manufacturers aimed to embody efficiency, simplicity and durability. The four speeds are taken from a carefully chosen range, calculated to cover all the requirements of modern planer work. These, with the constant high speed return of the platen, insure the greatest working economy.

The speed box is securely bolted to the top of the housings, these being of special design and very substantial. It is symmetrical in appearance and, being completely closed, insures the greatest economy of oil consumption and absolute freedom from flying oil. All shafts in the speed box run in long, bronze bushed bearings, lubricated by the "ring" or "dynamo" system of oiling. Frictions have been omitted, thereby eliminating trappy construction and slippage, and increasing the pulling power of the planer. The gears are of ample proportions, having wide face and coarse pitch. The pinions are of steel and cut integral with their shafts. Both the gears and pinions are cut with special cutters, insuring the greatest accuracy, longest life and minimum noise.

Any of the four speeds may be obtained by the simple manipulation of two convenient levers. A safety locking device prevents the engaging of two conflicting speeds at the same time. The index plate shows clearly how to obtain the desired speed.

In the Town Motor Carriage competion, held on October 15, 16 and 17 by the Automobile Club of Great Britain and Ireland, the highest award, a gold medal, was made to the White Steamer. This was the first competition of the kind ever held, and it was conducted with typical British thoroughness under the supervision of a competent technical committee. The object of the competition was to show the advantages of different types of self-propelled vehicles for town work. The principal points taken into consideration in making the awards were the general design, appearance and finish of the car, smoothness of running and comfort of passengers, absence of noise and vibration with car stationary or running, ease of starting and stopping, and accessibility for cleaning or repairing, in all of which features the White machine showed marked superiority.

SELF-PROPELLED VEHICLES.

(One Volume. Illustrated. Theo. Audel & Co., New York.)

A new and completely revised edition of James E. Homans' popular book, "Self-Propelled Vehicles," has recently been published by Theo. Audel & Co., of New York. The wide interest which the previous editions of this valuable work created has induced the author to greatly enlarge on the subject matter contained therein, and the edition just out can safely be said to fulfill every requirement of the motor vehicle owner, operator and repairer.

In his revision the author has emphasized the practical aspects of motor vehicles of all powers, confining his space to the discussion of matters fundamental in construction and management. Theoretical matters—important almost wholly to designers and builders—are introduced only where good explanations positively require them, and at no point is the reader's mind burdened with padded material on experimental and obsolete construction.

Recognizing that the gasoline vehicle is the typical automobile, considerable space is devoted to its complete discussion; theory, operation and an extensive chapter on "Gasoline Engine Management," the latter covering, virtually, all forms of difficulty liable to occur under service conditions. Anyone reading this chapter can derive an intelligent conception of the requirements for an expert driver, and will find numerous points of information, usually obtainable only by long and varied experience.

All the accessory parts of an automobile, carburetors, igniters, transmission gears, are fully explained by typical examples. The author properly assumes that an adequate knowledge of the principles upon which these devices are constructed will enable the reader to understand variations for himself.

To sum up the excellencies of this book, it must be acknowledged that it fulfills the ideal of the practical motor driver's vade mecum. All subjects are fully illustrated; as to its standard of book making, it may be said to be almost unequaled in paper, type work and binding. The book is admirably suited as an educational treatise, and will doubtless be widely used in that field.

One of the largest individual orders ever placed for concrete machines was that negotiated recently by the Ideal Concrete Machinery Company, of South Bend, Ind., with a large Eastern concern, which deals extensively in concrete machine and construction supplies. The order amounted to the sum of $250,000.

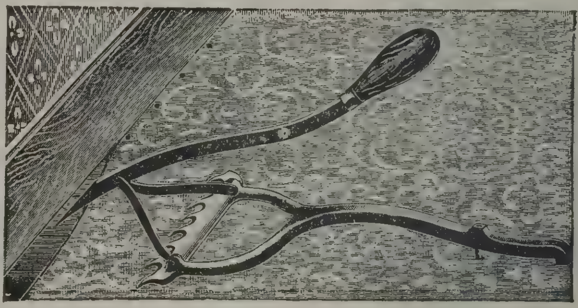
The figures tend to show the wonderful sentiment that is developing throughout the country in favor of concrete as a building material. The recent disasters at Buffalo, N. Y., and at San Francisco, Cal., have contributed largely to the movement in this direction, as in both instances the buildings of concrete were the only ones to resist the ravages of the destructive elements.

AN IMPROVED CARPET STRETCHER.

For practically every duty of the household which calls for the expenditure of much time and labor, modern ingenuity has devised ways and means of eliminating the drudgery and reducing the time required for its performance. And it is noticeable, too, that the predominating characteristics of these various devices and appliances are their absolute simplicity and the ease with which they perform work, which, in the adoption of old fashioned methods, called for the expenditure of so much physical exertion.

The force of this is seen in a comparison of old style with modern methods of laying a carpet. Some of the inventions which manufacturers have devised and placed on the market so successfully meet the requirements for which they were designed, that work of this nature is now done with remarkable rapidity, and all needless expenditure of energy is done away with.

In the accompanying illustration is shown one of the most improved and efficient carpet stretchers now in use. It has been on the market for some time, and its merits have become so well known that it is widely used both in this country and abroad. It is the product of George S. Knapp, Bridgeport, Conn., manufacturer of hardware specialties, art metal goods, etc.



CARPET STRETCHER.

The stretcher is practical, convenient and effective in operation, and is adapted to meeting the wants of the housekeeper or the professional carpet layer. It weighs but 10 ounces, and the tooth plate and frame are cast in one solid piece. Its operation is very simple. After the carpet is brought into place the pin is forced into the floor, and the lever is then folded back and down on the push bar. The carpet is held in position, which enables the operator to help himself to whatever is necessary to complete the nailing.

There has been a large increase in the exports of American clocks and watches. During the year 1906 clocks were exported to the value of $1,357,292, and watches to the value of $1,626,967. The largest purchasers of American clocks and watches were Canada, Great Britain, Japan, Australasia, Germany, Mexico, Argentina, Brazil, Chile and South Africa.

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THE GROWING FOREIGN DEMAND FOR OUR AGRICULTURAL IMPLEMENTS.

In round numbers twenty-five million dollars' worth of agricultural implements were shipped from the United States to various foreign countries in the course of the twelve months ending December, 1906. The official figures read $24,744,762, and do not include windmills, which are shipped at the rate of from eighty to a hundred thousand dollars' worth a month.

One-half of the total as reported consists of mowers and reapers, to be exact, $12,051,249. And more than one-half of the grand total for all implements is distributed in Europe, namely, to the value of $13,337,847.

The official classification of American exports is rather broad. Apart from mowers and reapers already quoted, plows and cultivators exported are valued at $3,886,636. "All other" agricultural implements total $8,806,877. Argentina is our largest customer. Last year she bought from us agricultural implements of all sorts valued at $4,703,622. Russia, however, is treading hard on her heels, for shipments to the amount of $4,673,243 were dispatched in 1906 to the land of the Czar. Third on the list of America's foreign customers comes France, with $3,070,043, followed by British North America, with $2,917,129; Germany, with $1,864,699; British Australasia, with $1,231,694, and the United Kingdom, with $1,036,674.

The trade is growing. 1906 showed an increase of more than $2,000,000 over 1904, or a growth of say 12 per cent. in two years. Reports from all parts of the world indicate increased demands and larger orders for this year. Machinery specifically adapted to certain territories is now being produced, and American manufacturers are making an active campaign for business in directions hitherto neglected. Prospects, then, for 1907 are unusually bright.

AMERICA'S EXPORT TRADE IN HARVESTING MACHINERY.

In spite of a certain amount of European competition the American export trade in harvesting machinery continues virtually to control the world's markets. This pre-eminence is not of mushroom growth, but has been attained by hard, persistent and intelligent effort extended over more than a quarter of a century.

Twenty years ago foreign field trials of harvesting machines were regarded as serious, almost vital, affairs by American manufacturers, who frequently made long journeys abroad in order personally to be present at some of the more important foreign trials. Today trials in general are ridiculed and the manufacturer's efforts are directed to escaping all but the very big ones of national character. As a matter of fact, other nations also manufacture reapers, mowers and binders. For instance, there are important factories of this character in England, Germany, Sweden and Hungary. Two things, however, operate to maintain the American position—and in this connection America must be understood as including both the United States and Canada. These are the low prices of the American machines and the superb organization and field equipment of our manufacturers who cater to this trade.

Even so far as price is concerned, those European machines which have directly copied well known American models are not able to meet American prices. It is the more remarkable that this should also be the case in such a country as France, where a differential tariff is maintained under which American machines pay a higher duty than do those of European manufacture. Even under these conditions other makers of harvesting machinery find it difficult in France to meet the ordinary quotations of American manufacturers. In Germany American machines seem to hold their own, notwithstanding that there are in that country so many manufacturers of similar apparatus.

The organization for foreign business that is maintained by practically all the American manufacturers in this line is both complex and complete, and may well serve as a model to American manufacturers of other classes of agricultural machinery and of other lines of manufacture.

Few of the harvesting machine companies follow the practice, all too common in every manufacturing country, of regarding their whole duty and responsibility finished when orders are carefully filled. On the contrary, their customers are well taken care of and are given actual practical assistance, protection and encouragement in a score of ways perfectly familiar to every foreign merchant who has ever had dealings with them.

There is today hardly a corner of the world, no matter how remote, where grain is grown where American harvesting machines are not known and sold, and this, too, in constantly increasing quantities. Even the Philippine Islands are beginning to use them, while in Turkey, Syria and Greece they have been known for years.

Portugal is probably the most backward of European states in the introduction of this form of machinery, while Egypt may be ranked along with India as hitherto insignificant factors in the trade.

Egypt suffers from a scarcity of animals suitable for traction purposes, while in India manual labor is absurdly cheap. Spain is one of the newer markets that has been developing very satisfactorily, even in spite of the crop failure of two years ago.

JAMESTOWN'S TER-CENTENNIAL EXPOSITION.

April 26 of the present year will be a memorable date not only in the history of Virginia but in that of the entire Western Continent. On that day will be opened the Jamestown Ter-Centennial Exposition, to be held at Hampton Roads, Virginia, and it undoubtedly will be one of the most remarkable military, naval, marine and historic exhibitions ever witnessed.

The exposition is to be a great and truly international celebration in which the armies and navies of the world will participate. It will be unique among expositions proper, because it will be one of the most historic and educational celebrations ever planned and carried into effect.

The object of the exposition is to celebrate the foundation of the first permanent English speaking settlement in America, which was laid at Jamestown, Va., May 13, 1607. It will be opened by the President of the United States at the noon hour of April 26, the three hundredth anniversary of the day that the adventurers who were to found Jamestown landed at Cape Henry. The celebration will be brought to a close November 30, 1907.

In connection with the exposition the Government of the United States purposes to have a great international celebration on the waters and shores of Hampton Roads. President Roosevelt has issued a proclamation, in which he has invited all the nations of the earth to send their ships of war to the scene of the celebration, and there participate in one of the most important international naval and military meetings that the world has ever known.

Contemporaneously and in close accord with this naval and military display there will be held a great historical, educational and industrial exposition. This part of the memorial will be worthy of the event and of the international exhibits. History will be exemplified from 1607 to the date of the fair.

The site of the exposition, which is one of unsurpassed natural beauty, contains approximately four hundred acres of land space, a forty acre enclosed water basin, and one hundred and sixty square miles of Hampton Roads. The headquarters of the Exposition Company will be at Norfolk, Va.

In connection with the military and naval display the Government will maintain a war museum, in which models of fortifications and harbor defenses and types of batteries on embankments will be shown.

In the exhibit buildings, of which there will be one for practically every State in the Union, will be gathered the choicest selection of industrial arts, of transportation devices, of historical displays, and a complete section will be devoted to seventeenth century handicraft.

Alaska, the Philippines, Hawaii and Porto Rico will have special representation and collections that will illustrate the peculiarities of these components of the American Republic.

AMERICAN THRESHING MACHINERY ABROAD.

BY BENJAMIN OLNEY HOUGH.

Only a few years have elapsed since the first real introduction of American threshing machinery abroad. But the time has already arrived when it may be asserted that the future of the American thresher in many foreign markets is secure. In Mexico, the Argentine Republic, Russia, Australia, etc., it is constantly gaining ground.

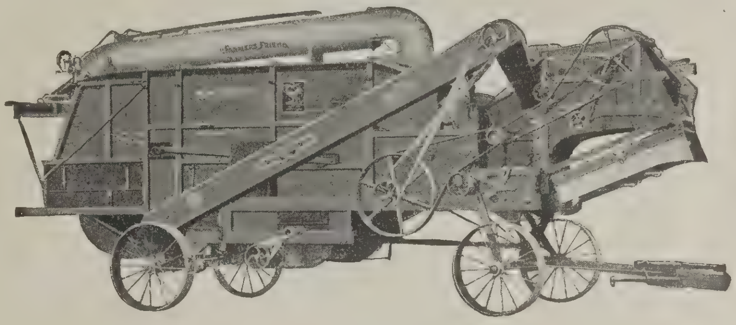
The experience of manufacturers in gaining a foothold in different territories has not infrequently been costly, but the lessons learned will assuredly prove to have been well worth the price paid. Much ignorance and prejudice has been encountered in some foreign countries. If the truth must be told, not a little yet remains, and more will undoubtedly be met with in the course of further expansion. For "the American theory" in threshing, as in other machinery, is not always thoroughly understood or appreciated.

Several years ago on board ship bound for Bombay the writer met an English manufacturer of steel pens, who one day expressed himself to this effect:

"My superintendent tells me that your American lathes are very good and very light, and their cost is reasonable, but that they don't last so long as our solider English lathes."

"There you have it," was the writer's reply. "You English build for time and eternity. Probably you expect to bequeath your lathes to your sons and they to their sons after them. An American buys a machine because it will do his work well, economically and rapidly. He doesn't often ask how many years it will last. He doesn't usually care much, so long as he is convinced that it will do his work as well or better than any other machine, and will serve him for a reasonable length of time, for he knows in the light of experience that by the time the machine goes out of commission there will be new ones in the market to take its place—machines that will do more work than the old, or better work, or accomplish it more cheaply. The American manufacturer or producer wants the latest improvements, must have them to make a living, to get rich in our country. He is perfectly willing to throw his antiquated model into the scrap heap and substitute any new improvements just as fast as they can be invented."

Very much the same line of argument applies in the case of American threshing machinery. Our manufacturer has nothing to say when foreign customers point to the more solid and substantial British separators. He cannot deny that they will very likely outlast his own. But he can and he does point out that his American threshers will do double the volume of work that the British will in a given length of time, can be worked with one-half the "crew" and cost much less in the first instance.



ANOTHER TYPE OF AMERICAN THRESHING MACHINE.

These considerations, he submits, are amply sufficient to commend his products wherever the spirit of modern progressiveness prevails. Where time has value there the American separator gains friends rapidly. People who want to "accomplish things"—to finish up their threshing and turn to other work which otherwise would be neglected or half done—these are buying American rigs in constantly increasing numbers.

To a certain extent it is true that threshing machinery, whether American or English, must sometimes be modified to meet extraordinary characteristics of certain special territories. Many American manufacturers have met this necessity, and have already introduced changes in their separators that experiment in the field has demonstrated to be actually desirable. But one of the commonest obstacles encountered by manufacturers has been the demand for slight or even for very radical change by foreign mechanics or farmers when no real necessity existed. For in operating a new and strange rig for the first season, nothing is more natural than that the foreign thresher-

AN IMPROVED THRESHING MACHINE.

man should miss some features that he has been accustomed to in the other separators and that have been his particular pets. But he is usually too little of a mechanic to understand what effect they might actually have if applied to the new machinery, or even to realize when their introduction into the new separator would be a physical impossibility.

In the course of their experiments American manufacturers have sent many of their own expert operators into the different fields, and in most cases their own officers have visited their foreign customers in person, and it is as a result of the observations thus made that a pretty clear idea has been gained as to the actual capabilities of our separators and what alterations in their original construction have been indispensable to success abroad.

One of the first strange requirements of American separators was encountered in Mexico, at the very beginning of our foreign business. This was the necessity of "bruising" the straw as it came from the separator. Several manufacturers met this demand by the production of a "straw-bruiser" that answered Mexican requirements. Later, when their machinery was introduced into Spain, Italy and the Levant, it was found that there, too, a "straw-bruiser" was required and that modifications in the Mexican apparatus were necessitated because the straw in these other countries was far woodier and tougher than any other we know of, and because also it was required to be cut up much finer than in Mexico. It is immensely to the credit of American manufacturers that this condition in turn was duly met and conquered, and to-day there are three or four (very likely more) American manufacturers who can and do supply their separators equipped with a "straw-bruiser" that answers the most exacting requirements.

Again, by way of illustration of what has been done by American manufacturers toward adapting their separators to all markets, it has been found that in some countries every grain carried over in the straw was carefully winnowed out and counted, and from the percentage of lost or broken grain the value of the new separator was judged. Hence it became necessary in some instances to restrict the normal speed of the separator and to supplement it with various devices, such as "re-cleaners" or "riddles," which have worked so satisfactorily that no hesitation is now felt in guaranteeing a loss of only one-half of 1 per cent., or no more than 1 per cent. as a maximum.

Two sorts of markets may be said to have been encountered by American manufacturers in their experiences. Markets such as that last described where every grain lost or broken becomes a serious reproach to the rig, where capacity per diem is a minor consideration—markets, for example, like Spain and Turkey—and the opposite extreme, markets like the Argentine and Russia, where no "straw-bruisers" are required and where the desideratum in a separator is the greatest possible capacity, irrespective of whether 1 or 3 per cent. of the grain is carried over.

In Russia, for instance, the season is short, and threshing has to be finished in the liveliest possible fashion. In Spain, on the other hand, time is not an object; the farmers seem not yet to have awakened to the fact that the wages and the services of their men are worth something in connection with other work on the farm. Moreover, the straw is continually examined with minute care to discover a lost grain or two. That American separators have successfully been adapted to both conditions is one more strong indorsement of our national perseverance and ingenuity, and furnishes a sufficient warrant for confidence in a very important future development of our export business in this line to other markets, as well as those already being exploited.

The self-feeder is one of the important features of American separators that especially commends them in countries where the grain is not bundled but is pitched up in tangled masses, and often by ignorant rustics without a rudimentary notion of how properly to "feed." This one feature is a very strong recommendation of our separators in all semi-civilized countries or those which are only just beginning to use machinery of any sort for this purpose.

American engines, too, whether traction or portable, seem to have met with general approval abroad. Almost the sole complaint against them is one that is so evidently absurd that an American scarcely feels called upon to disguise his amusement. It is sometimes said that American engines are rough and crude in comparison with their English rivals. But somehow the criticism is seldom coupled with the observation that the British engines cost more than half as much again as the American. This would seem to be another case where the buyer would like to "have his cake and eat it, too."

One need not withhold appreciation of the handsomely made and decorated English engines. One need not decry them in any respect, for they are admirable pieces of engineering. But the American engine "does the work," and its price certainly appeals strongly in these days of competition. A little paint, a stripe or two—any farmer can add them for himself, if he likes them; he will have plenty of time for the job after he has finished his threshing with his American rig and while his neighbors are leisurely working along with their English machines.

Few Americans or American industries stand still. Our manufacturers of threshing machinery have done well thus far. We expect to see them continue, and no less in the study of how still further to better their machines than in aggressiveness in making them known.

The awakening interest in American apparatus of this sort is demonstrated by the scores of inquiries that are constantly being received by all prominent manufacturers and not only from sources where machines have already been tried but from countries new to our system. Ultimate economy in production, compared with cost and operating expenses, is the magnet that attracts them.

AMERICAN HAY PRESSES ABROAD.

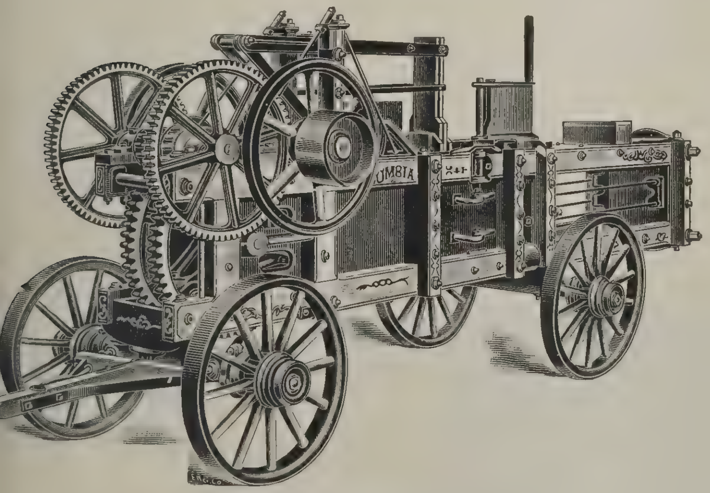
American manufacturers report gratifying increases in their export business on hay presses. New markets, or at least markets that are just now expanding very rapidly, include the Argentine, Spain and Portugal. Common report has it that after having visited the Argentine on one or two occasions as the representative of a certain American manufacturer in this line, seeking to work up the business there, one American is now so well satisfied with the actual present volume of the trade and its future possibilities in that country that he has taken over the whole business for his own account and has permanently established himself in the hay press business in the capital.

The business in Spain and Portugal is scarcely two years old yet, but has made astonishing progress, very much to the surprise of those manufacturers who are getting a share of it, as they were disposed in the past to regard these countries as among the most deliberate to adopt new ideas.

The uses to which American hay presses are there put would seem to indicate an early extension of the demand to other countries also where similar conditions maintain. For in Spain and Portugal hay presses are employed for baling the chopped or "bruised" straw resulting from their peculiar methods of threshing grain and which, instead of hay, forms the staple feed for cattle and horses.

It is understood that the American presses have satisfactorily met the rather unusual requirements made of them on this account, and these two markets may already be regarded as permanent acquisitions to American foreign trade in this branch of manufacturing.

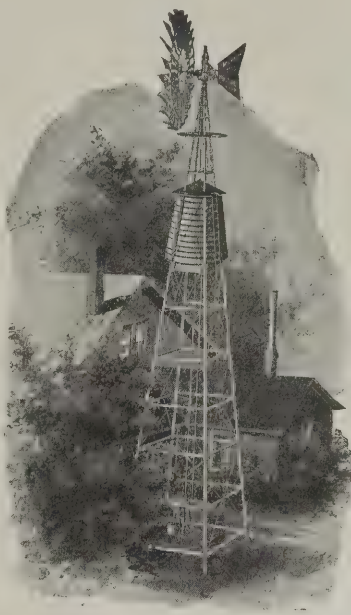
Experimental orders are also said to be now on their way to Syria and to Algeria for use under precisely similar conditions, and expansion in this direction is as sure to follow as it is that the presses themselves will give satisfaction if intelligently operated.



MODERN STEAM HAY PRESS.

AMERICAN WINDMILLS IN FOREIGN COUNTRIES.

One is inclined to regard American windmills as the milestones of American commercial expansion over the globe. For, travel in what direction he will, Europe, Asia, Africa or South America, the islands of the East or of the West Indies or the great continent of the southern Pacific, the tourist finds the scenery diversified at every step by familiar galvanized wheels topping spidery towers emblazoned "U. S. A." and the name or well known trademark of one of our manufacturers. Yet when the traveler comes to inquire a little into the question of foreign demand and supply, he is sometimes a little puzzled as to why the business is not far larger than it is.



AN AMERICAN WINDMILL.

He finds English mills and German mills so heavy and complicated and clumsy that he is not surprised to learn of the high prices demanded for them. He finds, too, many an ideal market for mills that is as yet uncultivated.

Curious facts sometimes present themselves. For example, in Egypt he will be told that, in spite of the constant demand for more water there, windmills are not in favor, because the natives will not climb towers and are afraid of windmills! Numberless suburban communities exist in the neighborhood of many large cities which are dependent altogether on wells, have no waterworks systems whatever, and ought to be profitable markets for windmills, but slight attention seems to have been paid to the question in many of them.

It is the constant wonder of the tourist why it is that merchants in these cities do not take up this branch of business with more energy. The business has invariably been exceedingly profitable wherever it was done right.

American windmills are cheap enough to commend them to any man who can indulge in a summer cottage, no matter in what part of the world, and merchants who make a specialty of catering to this trade always find round profits in their charges for the erection of the mills sold. In fact, in not a few instances as much is charged for erection as the cost of the whole outfit amounts to. In short, while the export trade in windmills is already flourishing, plenty of opportunity still remains for its increase, both on the part of manufacturers and of local merchants in practically every country in the world.

AMERICAN DISC PLOWS.

Competent representatives of American plow factories who have studied many of the world's markets in person assert that the future export trade for our disc plows is exceedingly encouraging. Whatever competition may now be offered by European or other manufacturers of moldboard plows has no bearing on the question of disc plows, for the latter are not yet satisfactorily produced anywhere outside of the United States and Canada. It is not denied that efforts have been made in Europe to imitate the American disc, but thus far without success.

An American traveling representative of one of our large plow factories, who has recently returned from a two years' trip around the world, reports that in the actual field trials in which he took part with samples of his factory's products, he had several notable successes with disc plows, much to the astonishment of buyers to whom they were a novelty. And, better yet, important business has been established. One of his stories illustrates the point at issue, as well as the extent of the widespread interest in and appreciation of the American plow in general.

The salesman in question visited Turkey in the course of his travels, found an opportunity of demonstrating his plows, ordered certain samples shipped in care of a prospective buyer, and went on to other fields, to return to Turkey several months later and conduct his demonstrations in person.

Upon his return he was greeted with a storm of criticism, because among the samples that had arrived were certain ones not considered suitable for the market—such, for example, as a double disc plow.

"What chance do you think we will have here in Turkey of selling any plows at $75 each," he was asked.

"Why, our people can hardly be induced to pay as much as $10. You don't seem to understand that Turkey is a poor country."

The American "guessed that he would have a try at it, anyway." And the result was that the double disc plow worked so well at the demonstration that a rich pasha who was present insisted on buying the sample on the spot and paying ready gold for it, besides ordering two more to be brought forward at once for his account.

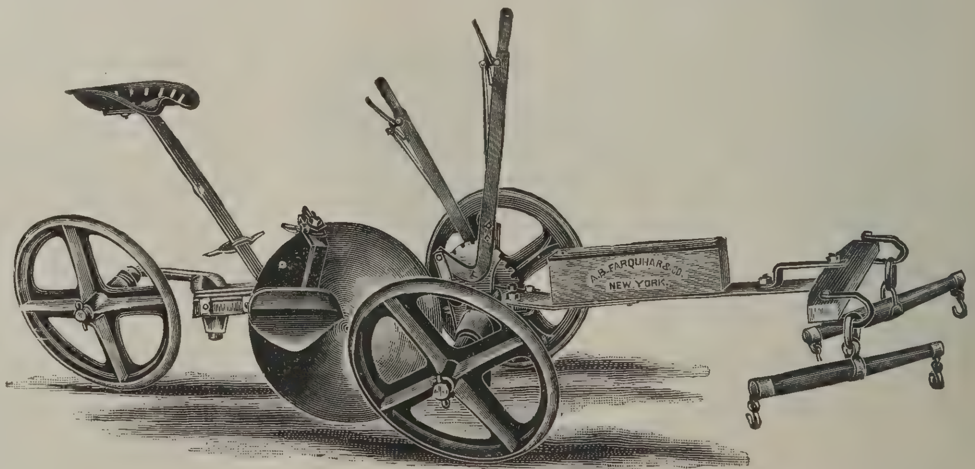
Business with other buyers promptly followed, and it is our informant's firm opinion that wherever hard and difficult plowing is found there the American disc plow will be admitted to be without a peer.

Some curious features are to be noted in the foreign trade for American plows, which has so largely expanded in recent years. For example, it is said that European manufacturers have not yet learned the secret of making soft centre steel. In fact, some of the leading French manufacturers are among the largest foreign customers of their American rivals, from whom they buy moldboards, landsides, etc., afterward assembling them into complete plows, which are marketed as of their own manufacture.

American plows are so well known and are beginning to attain so important a position in the markets of South Africa, Australasia and the Argentine that no comment in this regard is called for here. Mexico long since discarded her ancient "hooked sticks" and adopted American steel, which is also making distinct and flattering progress in other markets, particularly in the Orient, where for centuries the tillers of the soil have adhered to antediluvian methods.

American plows are rapidly increasing in popularity in the Philippines. Even Russia has begun to show an interest in American quality as contrasted with some German lack of it hitherto popular there.

Very light plows and middlebreakers only are exported from the United States to Egypt, where the fellaheen seem to have a constitutional prejudice against more muscular effort than can well be avoided. But here, as elsewhere, in all four quarters of the globe American manufacturers have implements well adapted to the requirements of the territory, and have established so satisfactory a position that it follows the coming year is certain to show a noteworthy increase in the volume of exports of American plows in general, irrespective of possible fluctuations in price quotations.



SINGLE DISC PLOW.

DOM PEDRO SQUARE, LISBON.

COMMERCIAL BENEFITS FROM INTERNATIONAL EXHIBITIONS.

BY JOHN BALL OSBORNE

(Chief, Bureau of Trade Relations, Department of State, Washington, D. C.).

The potential value to American commercial interests of the national and international exhibitions that are held in different parts of the world, particularly in Europe, is so self-evident as to require no demonstration; but I venture to say that there is no field of opportunity for the extension of their foreign trade that is so much neglected by American manufacturers and exporters as is this promising medium. Not so, however, with our commercial rivals; they are eager to participate in any kind of an exhibition, whether a world's exposition or a local fair, and not infrequently give international dignity to the modest efforts of some enterprising town.

While there are unquestionably some markets where our exporters are heavily handicapped in the matter of international competition, either because of geographical reasons, inferior transportation facilities, local prejudices, or tariff discrimination against imports from the United States, the chief obstacle to American trade expansion is the failure of our manufacturers to employ the same scientific methods in the introduction of their goods in foreign countries that are successfully used by their rivals. Certainly one of the most important of these media is systematic representation at national and international exhibitions.

In compliance with standing instructions from the Department of State, American consular officers have, for many years past, reported in regard to international expositions and industrial fairs to be held in their respective districts, and have frequently urged the manufacturers of this country to make exhibits of their products. In the case of important international expositions an official invitation to the United States to participate is invariably communicated to our Government through diplomatic channels. Besides being published in the

PARK, COLONIAL EXPOSITION.

Daily Consular Reports, information concerning these events is usually given wide publicity through the press.

The results, however, have been far from brilliant. There is no trouble, of course, about adequate representation at a veritable World's Fair like the Paris Universal Exhibition of 1889; and the American sections at Liege in 1905 and at Milan last year were fairly satisfactory; but, with respect to minor displays, for one opportunity embraced by American exhibitors there are a hundred ignored. I have frequently read reports by our diplomatic and consular representatives describing creditable exhibitions of national, or even international, character that have taken place and expressing regret that this country was not represented by the products of its manufactures.

For example, Mr. Hicks, the American Minister to Chile, in an interesting account of what he saw at a national exposition held at Talca about a year ago, expressed his disappointment that the total representation of American goods, machinery, and ideas consisted merely of a small filing cabinet from Rochester, N. Y., an American typewriter, and some school charts illustrating American plants and fishes.

He saw plenty of German and French machines, including a wheat-separator from the latter country, although one of the Chilian exhibitors, a flour manufacturer, acknowledged that the American machinery of this kind was the best in the world. The Minister added that the American duplicate of the machinery and manufactured articles shown at that exposition was far the best, and pointed out the pains that European manufacturers take to cultivate the markets of Chile, while our own manufacturers seem indifferent, although the commercial possibilities are extremely important and the feeling toward the United States is decidedly friendly.

It was the same in the case of the New Zealand International Exhibition, which was opened last November and proved to be the most important one ever held in Australasia. All nations were invited, and 7,000 copies of the official notice were sent to representative manufacturing firms in the United States; but there was no response from this country, the Standard Oil Company, through their New Zealand representative, being the only American concern with an exhibit.

Still another striking instance of wasted opportunities is presented in the case of the Jubilee Exposition at Bucharest in 1906, which attracted considerable attention from various European countries, but the share of the United States was limited to a few novelties in automatic slot machines and some agricultural machinery exhibited through an English firm.

A good example of the periodical fairs that might be, but are not, utilized by American manufacturers is the Leipzig spring and fall fair. At the fall fair of 1906 there were exhibits by 3,275 firms, distributed by countries as follows: Germany, 2,961; Austria-Hungary, 228; France, 40; Great Britain, 13; Netherlands, 13; Switzerland, 6; Italy, 5; Belgium, 4; Denmark, 2; Sweden, 2, and the United States, 1. Instances of this indifference might be multiplied indefinitely.

Several of our consuls have recently reported concerning the establishment in Germany of a permanent commission for exhibitions, which will devote its attention to matters pertaining to all important fairs, whether held in Germany or in foreign countries. This Commission began its work on the first of this year. Its avowed purpose is to promote the industrial and commercial interests of Germany by obtaining exact information respecting the aims, extent, and possibilities of each exhibition planned, and giving practical advice to German inquirers.

There are similar organizations in some other countries of Europe; for example, in Austria-Hungary a permanent commission representing three prominent manufacturers' unions looks out for the national interests at all exhibitions; France and Belgium also have such commissions, while in England a committee of the London Chamber of Commerce occupies itself with the work of keeping British manufacturers informed in regard to international exhibitions, sub-committees being designated to follow up individual exhibitions.

Since Secretary Root took charge of our foreign affairs the Government has paid more attention to the extension of the trade relations of the United States than ever before; intelligent efforts have been made—with a large measure of success—to remove restrictions affecting our commercial development in foreign countries; the consular system has been revolutionized, and the character of consular trade reports improved. In line with this sagacious policy, Third Assistant Secretary Wilson has given directions to the Bureau of Trade Relations to collate and systematize the data contained in reports made by our consuls on national and international exhibitions in foreign countries. There is nothing confidential or political in this material; but it is of great prac-

GIBRALTAR AND LA LINEA.

tical value to American business interests, and, hereafter, lists of coming exhibitions will be published at intervals, specifying the place, date, purpose, and duration of each.

Reports concerning the various exhibitions are transmitted by the Bureau of Trade Relations to the Bureau of Manufactures, of the Department of Commerce and Labor, by which they are published in the Daily Consular and Trade Reports with commendable promptness. I give below a partial list of the foreign exhibitions scheduled for the remainder of the current year, arranged chronologically and by countries.

GERMANY.

An International Sports Exhibition is to be held at Berlin from April 20 to May 5. The exhibition will include sailing and rowing paraphernalia, motor boats, outdoor games, sport and hunting outfits, skating, sledging, tobogganing, etc. Sale of goods will be permitted, under the usual conditions. Copies of the program and space applications have been furnished to the Bureau of Manufactures.

THE PORT OF STOCKHOLM.

An important agricultural fair will be held at Dusseldorf from June 6 to 11. This fair, which is an annual event held in some one of the larger German cities (last year at Berlin), will afford an excellent opportunity for the exhibition of American agricultural implements and machinery.

An International Exhibition of Motor Boats will be held at Kiel from June 15 to 30, under the patronage of Prince Henry of Prussia. It has been organized by the Imperial Automobile Club, the Union of German Manufacturers of Automobiles, and the municipality of Kiel. The exhibits will include naval, mercantile, fishing, and sporting craft; motors and accessories; articles of equipment; fuel, etc. Copies of the program, regulations, and application blanks are on file in the Bureau of Manufactures.

On the occasion of the Congress of Hygiene and Demography, to meet at Berlin September 23 to 29, a hygienic exposition will be held. It will be of a scientific character and present as complete and synoptic a view as possible of the present status of scientific research in the domain of hygiene.

FRANCE.

Historically and politically the most important exhibition of the year in a foreign country—of course, the Jamestown Exposition, which opens April 26, is the leading international event of a commemorative character—will be the International Maritime Exposition to be held at Bordeaux from May 1 to October 30, in commemoration of the invention of steam navigation by Robert Fulton. It will be under the official patronage of the French Government, which has invited this Government to participate. In recognition of the special honor to the memory of a great American, our Navy will be represented by several war-vessels, and Congress, just before adjourning, appropriated $15,000 to enable the Government to participate by the erection of a pavilion, the sending of an exhibit, and by suitable official representatives. The program enumerates sections devoted to the advance made in the past one hundred years in the merchant and naval marines, automobile navigation, ocean and inland fisheries, hygiene and life saving, mariner's apparel, etc. It is stated that a committee of British exhibitors engaged in shipbuilding will display ship models and the many and varied accessories of a modern ship.

Consul-General Frank H. Mason advises Americans that the best way to introduce auto machine mechanisms and parts into France is to exhibit at the annual Automobile, Bicycle, and Motor Boat Exposition held in November or December of each year at Paris.

ENGLAND.

The third International Tobacco Trade Exhibition will be held in London April 20 to 27.

The International Exhibition of Technical Papers and Periodicals, Graphical Trades, and Advertising will take place in London in May and June.

The Fifteenth Annual Exhibition and Market of the Grocery, Provision, Oil, and Italian Warehouse, and Allied Trades will be held in London September 21 to 28.

IRELAND.

The Irish International Exposition to be held at Dublin this summer deserves more than passing notice, for it will afford American manufacturers a rare opportunity to place their products before the Irish people in a market that is directly accessible at low freight rates. The following notice of this Exposition, based upon a report by Consul Moe of Dublin, appeared in the Daily Consular Reports some time ago:

AVENIDA, LISBON.

"Nearly 1,000 guarantors, representing all classes of the community, have subscribed to a guaranty fund which already exceeds $730,000. The president of the exhibition organization is the Marquis of Ormonde, and among the vice-presidents are the Earls of Pembroke, Meath, Drogheda, Mayo, and other well-known men. James Shanks is secretary and chief executive officer. The object is to promote and foster the industries, arts, and sciences of Ireland by a display of the products for which the country is famous, and of the products of partially developed industries for which special facilities exist in the country."

NETHERLANDS.

An International Motor and Machine Exposition will be held at Amsterdam from the middle of August to the end of September. Consul Hill of Amsterdam urges that this opportunity be brought to the attention of possible American exhibitors. Copies of the application blanks are on file in the Bureau of Manufactures.

NORWAY.

A Motor and Motor-Boat Exposition will open in Bergen on July 5 and continue nine days. The invitation was issued to all Scandinavian manufacturers and Norwegian agents of foreign-built motors. Consul Cunningham, of Bergen, writes that American motors can be exhibited by a Scandinavian agent at the exposition, and the award, if any, will be made in the name of the agent. The Consul calls attention of Americans who intend to seek this trade of the importance of being represented at the exposition.

SWITZERLAND.

The Third Swiss Automobile and Bicycle Exhibition will open at Zurich May 15, under the auspices of the Geneva Central Committee. There will be a section for foreign exhibits.

BELGIUM.

A commercial fair under the name of the "International and Colonial Exposition" will open at Antwerp in May and close in September. Exhibits may be sold without restriction.

In connection with the Second International Congress of "Gouttes de Lait"—Protection of Child-Life—which will meet at Brussels September 12 to 16, an exhibition of Infant-Hygiene will be organized and opened. Copies of the announcement and program may be obtained on application to the Bureau of Manufactures.

BRAZIL.

On the occasion of the Sixth Brazilian Congress of Medicine and Surgery in Sao Paulo, in September, there will be an exhibition of all kinds of national chemical products, as well as all kinds of serums, vaccines, etc.

MEXICO.

The second annual Exposition of the Agricultural and Industrial Union of Potosí will be held in the City of San Luis Potosí in September. It will show the progress of Mexico in agriculture, mining, and manufactures, and merits the attention of American manufacturers of implements and mining machinery, as well as owners of registered stock. Further information may be secured from the American Consular Agent at San Luis Potosí.

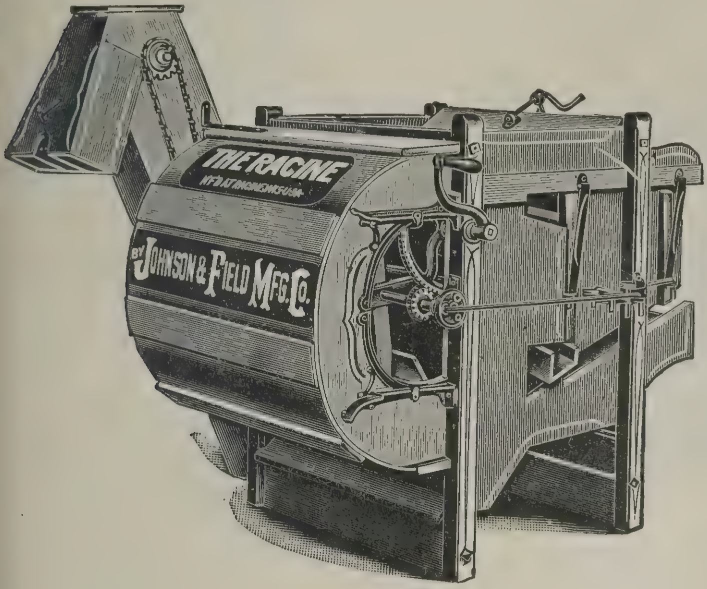
EXHIBITIONS IN 1908 AND LATER.

Among the foreign exhibitions announced for the year 1908 are the following: Franco-British International Exhibition of Science, Arts, and Industries in London; Scottish National Exhibition in Edinburgh; Exposition of Electrical Appliances in Lyon, and Tercentenary Exposition in Quebec. For 1909 there is our own Alaska-Yukon-Pacific Exposition at Seattle. Looking still further ahead, World's Fairs are being planned by Belgium and Spain in 1910 at Brussels and Barcelona, respectively, and by Germany and Japan in 1912 at Berlin and Tokyo, respectively.

Hereafter, if they would keep abreast of the enterprise of their commercial rivals, American manufacturers and exporters must take advantage of the opportunities for trade expansion afforded by these numerous foreign exhibitions.

COMBINED GRAIN GRADER, CLEANER AND SEED SEPARATOR.

Every year throughout the various grain-producing States of the country many thousands of dollars are paid to lecturers at institutes and colleges to instruct grain growers on the importance of using good cleaners and graders so as to take bad weed seeds out of grain before it is planted in order to avoid having farms polluted with foul weeds. At many of the agricultural colleges courses of lectures are arranged for farmers, and fanning mills are used to demonstrate the best methods of grading, cleaning and preparing all kinds of seed and grain for planting. In addition to this, several of the States in the corn belt send out their seed corn special trains to inform the thousands of farmers who meet these trains at nearly every station of the great need of having seed corn carefully graded.


THE RACINE
BY JOHNSON & FIELD MFG. CO.

FRONT VIEW OF FARM MILL, WITH ELEVATOR.

In all parts of the civilized world where grain or seeds are raised fanning mills have demonstrated their great value and indispensability to the farmer, as they have now been in use, in some form or another, for a great many years. In the construction of the machines, however, extensive improvements have from time to time been made, and labor-saving and crop-improving devices added, until the modern fanning mill represents a degree of perfection that leaves little room for the suggestion of improvement.

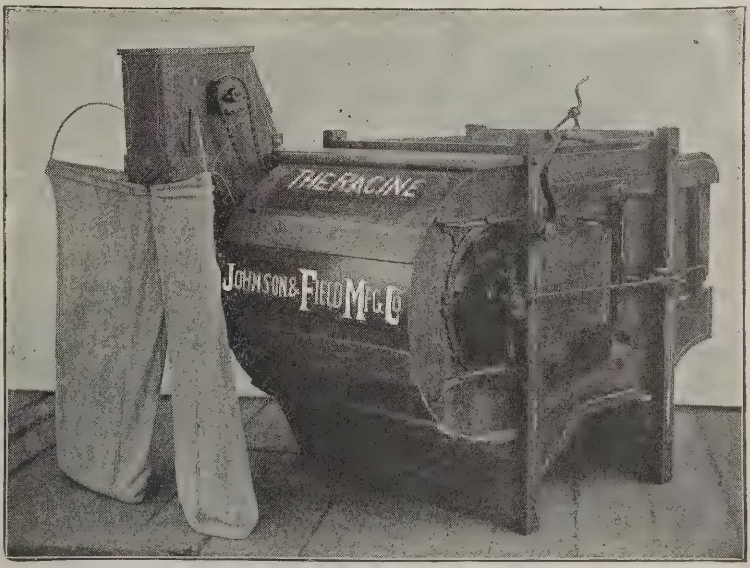
The accompanying illustrations represent types of what is said to be the most extensively used fanning mill now being manufactured. Its makers have been engaged in the production of these machines for thirty-five years. They have made an exhaustive study of the needs of the farmer, and their fanning mills are recognized throughout the world as the standard of excellence, embodying as they do every desirable and improved feature known in fanning mill construction. Their efficiency, high-grade construction and adaptability to a wide range of work have won for them universal favor among grain and seed growers, flour mill and elevator operators, and the export call for them is scarcely less large than the domestic demand.

The machine is a combination of grain grader, cleaner and seed separator, and it is adapted for cleaning any kind of grain or seeds, as well as coffee, rice and cereals. Notable among the improvements on this machine are the succotash (oats from wheat) attachment, seed corn grading attachment, oat grading attachment, and bagging attachment. The succotash attachment is one of no small importance, and the addition of this improvement has created a greatly increased demand for these mills. It is said to separate oats and barley from wheat at the rate of 30 to 60 bushels per hour in the farm size mill, and in the larger sizes, which the makers term their warehouse and dustless fanning mills, several hundred bushels per hour can be separated.

The seed corn grading attachment is a device which fits in the mill and grades seed corn, taking out the butt and tip grains from the flat, even ones, enabling a corn planter to drop a uniform number of grains each time, which gives a uniform stand of vigorous stalks in the field that produces many more bushels to the acre.

The bagging attachment holds two sacks at once, and does the work of two men by elevating the grain or seeds into the sack; there is no grain wasted, no bags to hold, and no grain to shovel. In this way the farmer can clean and grade his own grain independent of hired help.

In the construction of the mill its manufacturers, the Johnson & Field Manufacturing Company, of Racine, Wis., have spared no efforts to make it superior in every way. The very best materials are used, and to the smallest detail of the machine the utmost care and attention are given. It is strong, and of sufficient weight to keep its position while in use, and will not slide around in any direction like lighter mills when doing heavy work.

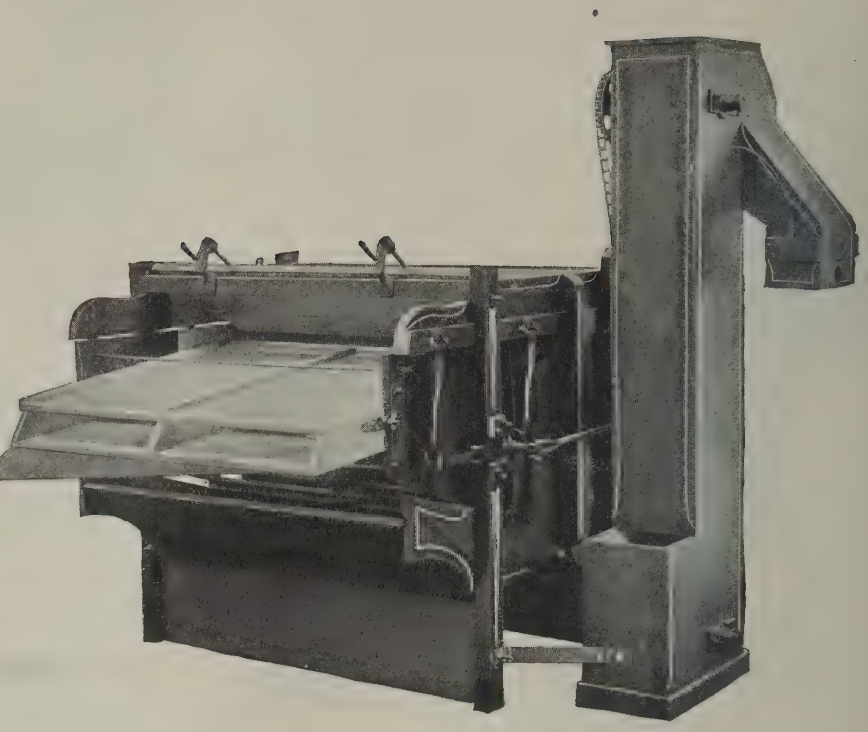


FARM MILL, WITH ELEVATOR AND BAGGER ATTACHMENT.

The irons in the mills are of the most approved pattern, the wheel, pinion and shake irons being extra strong. The gearing is all placed on the inside of the mill out of the way. The bearing is formed by the hub of the large wheel running in a thimble or box of chilled iron and extending through the posts, giving it a steady and easy motion.

The fan and wind boards are so arranged that the wind strikes the hurdle in such a manner as to blow all foul stuff and light grain over the hurdle. The side spout delivers the No. 1 grain at the side, and No. 2 grain at the front of the mill. The grader can be so adjusted as to separate and deliver through the side spout a greater or less portion of the best grain. The wheat screens and grader are so arranged as to effectually take out cockle, chess or cheat from Nos. 1 and 2 wheat.

Each mill is furnished with one wheat hurdle with top sieve of zinc, one wheat screen and grader with side spout, one barley sieve and one oat or corn sieve.



REAR VIEW OF WAREHOUSE MILL.

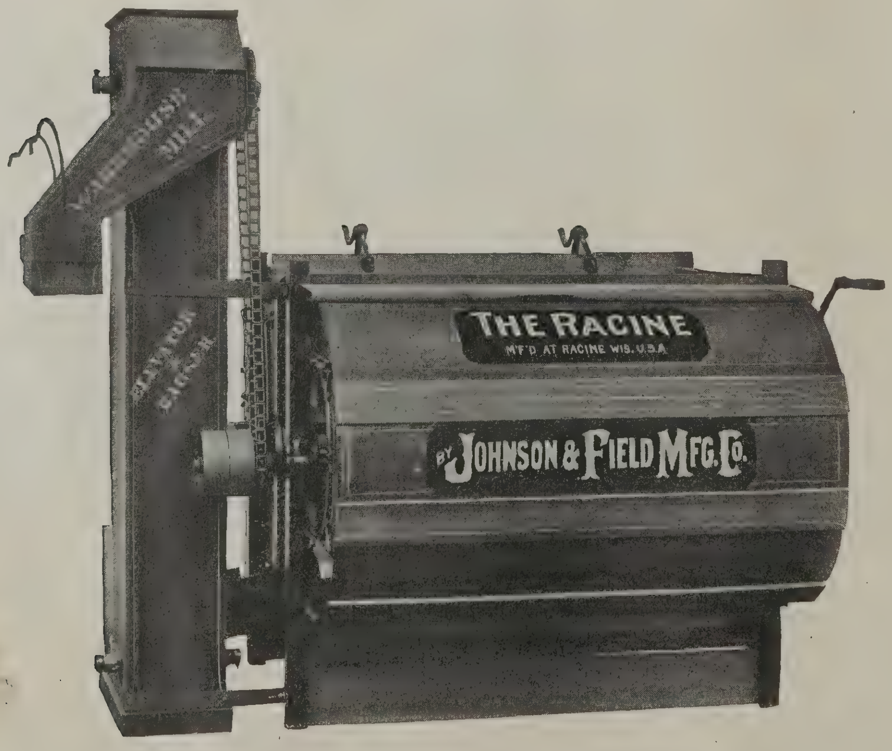
Many of the mills of this concern are also equipped for grading onion sets; for use in malleable iron foundries in taking dust out of packing, and in peanut factories for grading and cleaning peanuts.

To meet the varied requirements of users of these machines they are made in a variety of sizes, ranging in capacity from 600 to 6,000 bushels per day.

The warehouse mills are constructed on the same principles as the farm mills, only they are made much larger, heavier and stronger in every way, and can be run by power as well as by hand. They are made out of selected and thoroughly seasoned lumber (kiln dried). All the irons are of the most approved patterns. The shoe is worked by eccentrics and heavy shake rods, connected with elbows by bolts on both sides of the mill, thus making a double protection, as either will run the mill. The bearings, boxes and the irons are fastened on with carriage bolts. Each mill is provided with six inch tight and loose pulleys, but any required size may be had.

These warehouse mills are extensively used in the United States by leading millers, elevator men, grain and seed dealers, and the export demand for them is a steadily increasing one.

The company also manufactures special warehouse mills with a capacity of 25,000 bushels per day. These, however, are generally built on contract and are not kept regularly in stock.



WAREHOUSE MILL, WITH ELEVATOR AND BAGGER.

The postal department of Berlin has just given an order for 200 automobiles, to be used in its service within the suburbs of that city in place of horses. Consul General Richard Guenther, of Frankfort, further notes that in Germany and many other European countries the postal service includes the transportation and delivery of parcels and small freight which in America is carried on by express companies. Hence the larger number of mail vehicles required by the postal departments of Europe.

SOME IMPROVED MACHINES FOR FARM USE.

On the farm as well as in villages and cities the practical and economical housekeeper has come to realize the advantage and importance of having a hand grist mill for grinding grain for table use, and the demand for this class of machine is a very large one. In farming communities grist mills are, of course, of double value, since in addition to their usefulness in preparing cornmeal, graham flour, breakfast cereals, etc., for family use, they can be utilized in grinding grain for poultry and other stock.

The mill shown here is said to be admirably adapted for all these and many other purposes, and it possesses many advantages and improved features not found in the average grist mill. In place of the hand wheel usually found on machines of this kind it is equipped with a long malleable iron crank, which makes the machine lighter and easier to run. The grinding burrs are of the strongest and hardest metals, and all the bearings are chilled. With this machine it is not necessary to have more than one set of burrs to grind different qualities of meal; the fineness or coarseness is determined by simply tightening or loosening two thumb screws.

All kinds of grain, rice, seeds, spices, etc., may be ground in the mill, and in as small quantities as may be desired. The long crank and the chilled bearings give such an easy running gear to the machine that an operator may grind a large quantity of grain without becoming tired. The mill runs steadily and smoothly, and there is never any clogging or jerking. There is nothing about the machine to get out of order, and all parts are interchangeable. It is provided with both holes and slots for fastening it to a table or other support, and it is light enough in weight that it can easily be carried from place to place wherever it is most convenient to do the grinding. Poultry raisers have found this machine of special value, as it can be used for cracking corn and grinding grain to whatever degree of fineness is best suited to the age or condition of the chickens. The manufacturer of the mill is A. H. Patch, Clarksville, Tenn., whose corn shellers, separators, and other farm machines have become so well known and widely adopted.

HAND GRIST MILL.

An illustration is shown here of his most popular style of hand corn sheller. This machine has been introduced into almost every corn-raising country in the world, having originally been placed on the market in 1886. Important improvements have from time to time been made in its construction, until it now embodies every essential feature desired in this class of machine, and is acknowledged to be unsurpassed for efficiency and durability.

CORN SHELLER.

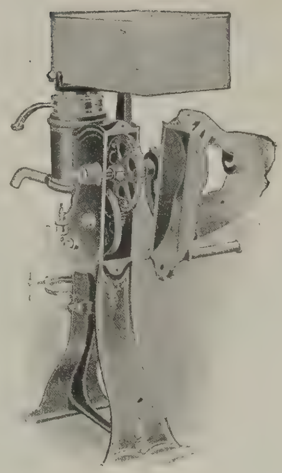
The model shown here has enclosed hopper and separator, which prevents scattering of the shelled corn. It can be clamped to a barrel or tub as well as to a box or bin, the fastening being done instantly by means of two large, strong clamps with wing nuts. All parts of the mill that are put to a heavy strain are made of malleable iron; the bearings are long and of chilled iron, which makes the sheller very durable, as well as easy to run. The capacity of the machine is eight to fourteen bushels per hour, making it large enough for all home uses.

CREAM SEPARATORS FOR FARM AND DAIRY USE.

We show in the accompanying illustration a type of separator which has become almost universally known and has won for itself an enviable reputation for superiority, both in exhaustive skimming and perfection of manufacture. It is built on the most improved lines, being free from complicated mechanism, and in addition to its perfect skimming qualities and easy mode of operation it has the desirable advantage of being easily and quickly cleaned.

The machine has been on the market for a number of years, being widely known as the U. S. separator, and during that time its efficiency and wearing qualities have been amply tested. It possesses great strength and durability, and can be operated either by hand or by power. There are few working parts, and these are accurately made, work together smoothly, and are easy to get at.

The most essential requirement of a cream separator is that it will skim clean, and the bowl of the separator is its most important part, as in it is done the separating. This machine is so constructed that there are practically three bowls in one, the milk that passes through it being skimmed three distinct times. The remarkably thorough separation for which these machines have become famous is due to this exhaustive process and the high efficiency



IMPROVED CREAM SEPARATOR.

of its two corrugated cups. The bowl separates the cream from the milk by whirling around several thousand times per minute. The gears get up this high speed, although the crank turns only about 50 times per minute.

In the construction of the machine only the best materials are used, each being specially selected for its particular use. The gearing and bowl are entirely enclosed by a strong iron frame when set in the separator ready for work. This advantage gives longer life to the machine. The oiling of the various parts is taken care of automatically, and there is little or no friction when the machine is in operation.

The manufacturers, the Vermont Farm Machine Company, of Bellows Falls, Vt., make this separator in a variety of sizes, ranging in capacity from 150 to 700 pounds of milk per hour. In designing the machine they have carefully considered the requirements of both home and foreign trade, and the large demand which has been created for these separators in other countries is a high tribute to their reliability and efficiency.

An important feature of the machines is the ease and rapidity with which they can be cleaned. Unlike many separators which have an extremely complicated bowl consisting of many parts, each of which must be washed separately, the bowl of this machine has but four parts—two simple inside cups, the smooth steel bowl shell and the cover. The bowl shell and cups are wide enough to be easily cleaned inside.

HORIZONTAL GRAIN CLEANING MACHINE.

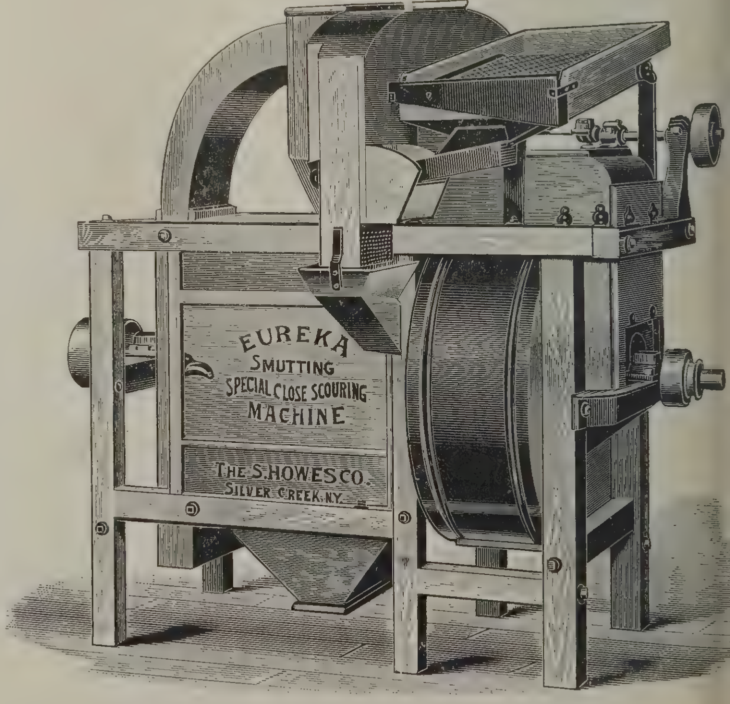
In all countries where wheat is raised machines for scouring or cleaning it are used in very large numbers. Naturally this has resulted in the production of an almost endless variety of devices and machines designed to perform such work quickly, easily and well. In the accompanying illustration is shown what is said to be one of the most efficient and reliable smutter and separating machines now being manufactured. It has been on the market for twenty years, and during that time has become so widely known that it is now used in every wheat-raising country in the world.

The process of scouring the wheat, that is, of thoroughly cleaning it of all foreign matter, light and heavy or larger than the grain itself, is done by means of sieves in the vibrating shoe and the air suctions which take effect as the grain passes from the shaking shoe to the scouring cylinder. This cylinder is equipped with flat and conveyor beaters, which thoroughly scour the grain against a cylindrical scouring case made of chilled cast iron. The beaters scour off the dirt and the beard from the end of the grain and put in in good condition for milling or the market.

The makers of the machine, the S. Howes Company, of Silver Creek, N. Y., are one of the oldest and largest manufacturers of grain cleaning machinery in the world, and their extensive experience in supplying the needs of grain dealers has enabled them to produce in their horizontal scourer a machine that embodies every important and improved feature known in this class of machinery construction. It is very compactly built, and the operating parts are so nicely balanced that when set solidly upon the floor positive and unvarying operation may always be relied upon. It is so constructed that it may be driven from either end, thus rendering its employment possible under every condition of circumstance or surrounding. All bearings are in plain sight and easily reached.

Its operating mechanism is said to be radically different from that used in other machines intended for similar use. The entire scouring case is of iron, hardened by a special process, and the openings therein cast upon chills. The scouring case is a highly ventilated one and is made in sections, and same can be opened or removed quickly when desired.

The beaters on the scouring cylinders are adjustable, thus adapting the machine for treating the softest as well as the hardest grain without liability of breaking the kernels. The beaters approach the grain at an angle, thus securing the double scouring action without liability of attrition or breakage. They serve also to continually force a current of air through the grain under treatment, thus facilitating and aiding in the escape of the loosened impurities through the openings in the scouring case the instant they are removed from



GRAIN SEPARATING AND SCOURING MACHINE.

the grain. At no time, while the grain is under treatment, is there a heavy body in the scouring chamber. The construction of the case and cylinder is such that the grain is thoroughly scoured in its passage through the machine.

A feature of this scourer is its perfect ventilation. A heavy, but controllable current of air is drawn through the grain as it enters the scouring chamber, while it is under treatment therein, and finally as it leaves the scouring chamber, thus assuring the removal of all loose and loosened impurities.

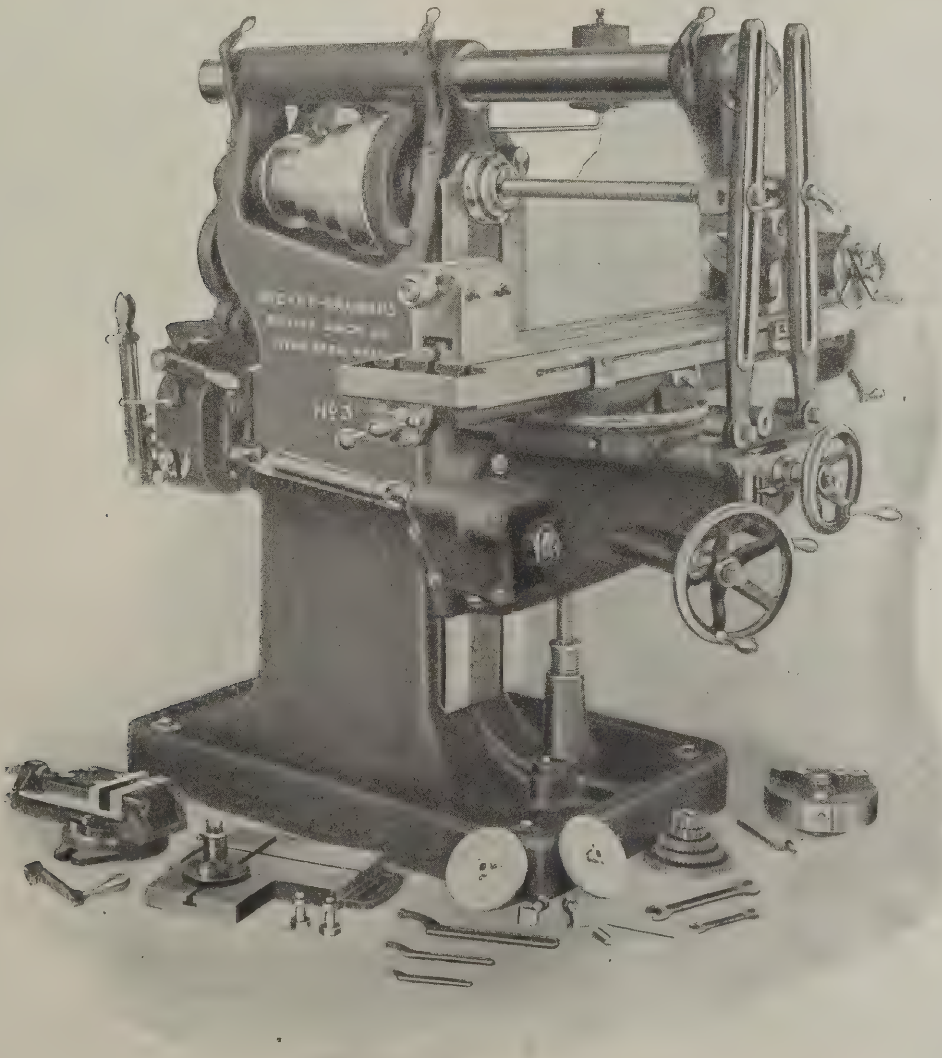
SOME UP-TO-DATE MILLING MACHINES.

The milling machines shown herewith embody a number of new and important improvements which will be appreciated by all users of this class of machines. The vertical miller is a machine especially adapted for all manufacturing purposes, and it is said to possess every desirable convenience that modern milling machine practice demands. Its utility is unlimited, and although it is built large and heavy it will do a small range of work as economically as heavy work.

The vertical movement of the head is actuated automatically by a worm gear. For boring purposes it is provided with an automatic stop dog, which will throw out the feed at any point within its limit. A micrometer stop gauge at the upper left hand side of the head accurately gauges the depth of the cut. The spindle end is threaded to receive large surface mills. Medium cutters are secured by means of a draw-bar passing through the hollow spindle. The spindle driving pulley is mounted upon an adjustable auxiliary bearing.

The boxes are made of hard bronze, and the bearings are of generous proportions, provided with means of adjustment for taking up wear. A flat vise is furnished with each machine. The rotary attachment is fed automatically or by hand, and has automatic stop dogs for throwing out the feed at either end of the segment. The feeds are derived from compounded gears, giving eight changes for each change of spindle speed. The cut shows the machine fitted up with oil tank, pump, relief valve and connections.

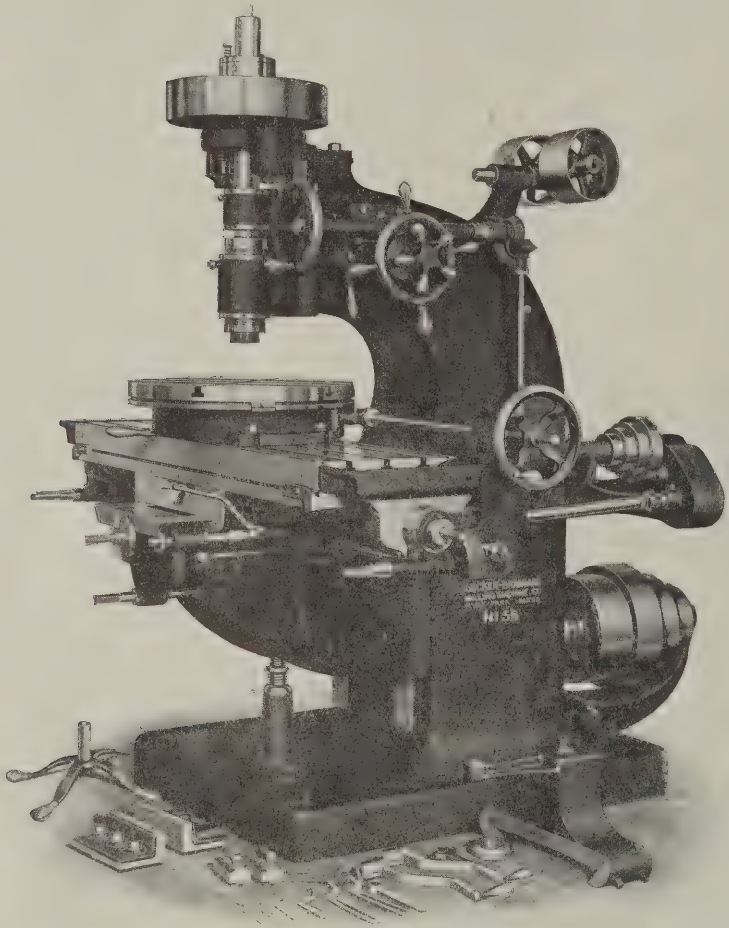
The machine shown in the second illustration is one



UNIVERSAL MILLING MACHINE.

of the most popular of the many milling machines made by this company, the Becker-Brainard Milling Machine Company, Hyde Park, Mass. Its construction embodies every late improvement in this class of machine, and the variety and superiority of the work of which it is capable have caused it to become one of the most widely used millers now being manufactured.

Among the important features of this machine are the positive gear feed and change feed mechanism, by which twenty changes of feed can be made without stopping the machine; the new clutch mechanism in connection with the hand wheels; and the box type knee and telescopic elevating screw.



VERTICAL MILLING MACHINE.

The spindle, which is made of hammered crucible steel, has a three-quarter inch hole through its entire length, and runs in self-centering bronze boxes arranged to compensate for wear. It has a dust cap on the front end, and is threaded to take a chuck. It is connected with the change feed mechanism by three spur gears, making a positive driven feed.

The platen has an automatic, longitudinal and cross feed in either direction, and, being centrally driven, feeds freely at an angle to 45 degrees right or left hand. The knee is of the box type and is supported by a telescopic elevating screw, so that no holes are necessary in the floor. It is provided with automatic vertical feed and knock off.

The hand wheels are provided with a clutch arrangement enclosed in a hub which operates the vertical movement of the knee and cross movements of the carriage. When either the knee or carriage has been set to the required position the clutch may be instantly disengaged by pressing in the knob on the front of the hand wheel, thereby preventing any accidental change from their fixed position, and also preventing them from revolving when the automatic feeds are thrown in. The dials are adjustable and graduated to read to thousandths of an inch, to indicate the vertical, transverse and longitudinal movements of the platen, and are set at any position with the set screw.

The dividing head can be set at any angle from 10 degrees below the horizontal to 5 degrees beyond the perpendicular. The front end of the spindle is threaded to the same size as the machine spindle, and also fitted with the same taper. By means of the raising block the head can be set at any angle on the table, and the back centre can be set at any angle for taper. The head is arranged for differential indexing. The ten change gears, which are sent with the machine, make a combination which will cut nearly any spiral from 1.25 to 68.75 inch pitch to one turn.

Colonial Director Dernburg recently made an important speech before the Chamber of Commerce in Berlin, explaining Emperor William's so-called world policy. In the course of his remarks Herr Dernburg pointed out that the English speaking nations of the world in the middle of the eighteenth century numbered 9,000,000, while the German speaking nations at the same period numbered 20,000,000. Today, he added, 120,000,000 speak English and only 70,000,000 speak German. Germany, he went on, has lost a position of relative importance in the world because she has few colonies, and is dependent more than ever on other countries for raw materials and food supplies.

The colonial director then described the rapid development of the United States and its increasing economic importance and commercial influence throughout the Western hemisphere to the detriment of European nations. Light and electric power plants in Brazil, he said, have passed from German to American hands, great mining undertakings on the Pacific coast of South America are in the hands of the citizens of the United States. Japan and the United States are favored by shorter freight routes, and are thus gaining on Germany in supplying the Chinese market. Moreover, the planters of the Southern States of the United States are trying to arrange for the control of the price of cotton. The advance of 1 cent per pound would mean an added cost of $20,000,000 to the world's manufactures.

The American Exporter can corroborate what Herr Dernburg says about American electrical appliances in Brazil.

During his visit to that country last summer the publisher found that nine-tenths of all the light and power plants in that country use American machinery. There are many important electrical enterprises in Brazil.

MODERN INCUBATING MACHINES.

The subject of incubation is by no means a new one, as machines for hatching eggs date back many centuries. Nearly all poultry dealers are familiar with the old style Egyptian ovens and the crude manner in which eggs were incubated at that period. The really successful machine, however, is of comparatively recent date. In the last fifteen years the development of the incubator has been marked by many important improvements, and in construction, regulation, heating and ventilation the machines turned out today by leading manufacturers are well calculated to please the most exacting farmer or chicken fancier.

The machine illustrated herewith is a typical example of the well made and thoroughly up-to-date incubator. It is widely known under the name of the "Star," having been on the market for many years, and its merits have been well tested. One of the remarkable features of the machine is its adaptability to varying conditions of incubation, as it will hatch any and all kinds of eggs.

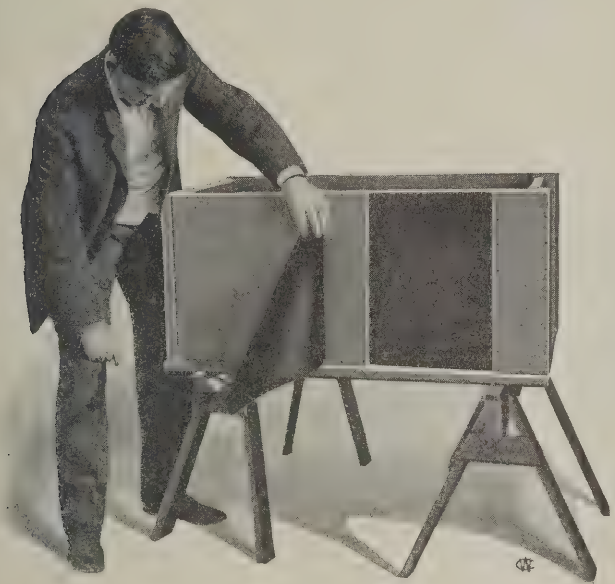


FIG. 1.

The incubator is a double-cased machine, lined with a specially prepared roofing. This roofing is securely fastened to the outside of the inner case, as shown in Figure 1. On this are nailed blocks one inch in thickness, then the outside case is fastened to that and the space between is thoroughly packed. From Figure 2 it will be seen where the radiator is placed. This illustration also shows the careful manner of packing. A heavy sheet of asbestos paper covers the radiator, then a line of wool packing, then a sheet of roofing and alternate layers of this material until the space above the radiator is completely filled. Another sheet of the roofing extends over the entire top, this being securely fastened to the top of the outside case. With this efficient lining and careful packing, the machine is well fortified to resist outside changes of temperature.

The heating and ventilation system is the most perfect that could be devised. The fresh-air flue is located below the radiator. The heater is so arranged that the fresh air must continually enter the egg-chamber, thus constantly supplying fresh air to the incubating egg regardless of how warm the room may be or how low the lamp is run. Unlike many incubators which have the heaters hanging out on the end of the incubator, the heater in this machine is tightly boxed in. This focuses the entire heat within the incubator and precludes the possibility of any of it being radiated to the room in which the incubator is placed. The regulator of the machine is positive and accurate in its workings. It is simple in construction, there being no bolts to get loose or work off, and it regulates the heat without the least change. The egg tray is of the plain open type, well and carefully made, and is easy to handle.

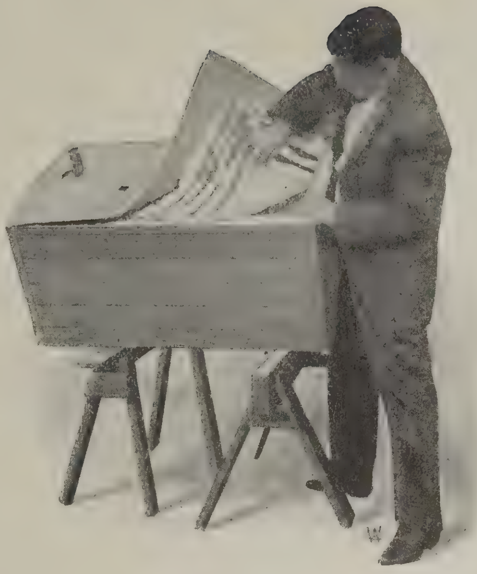
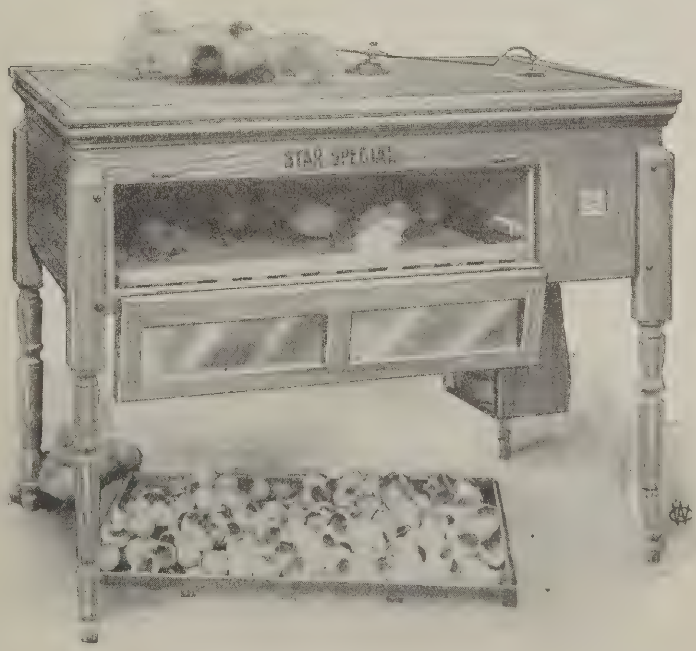


FIG. 2.

An important part in the operating of an incubator is



100-EGG CAPACITY INCUBATOR.

the care of the chick after it is hatched. Until a few years ago when the chicks were hatched it was necessary to keep them in the machine until the hatch was complete, as an incubator door should never be opened until the hatch is completed. This compelled the chicks first hatched to remain in the machine longer than was necessary, which was a great disadvantage where the hatches were large. The manufacturers of this machine, the Star Incubator and Brooder Company, of Bound Brook, N. J., have overcome this difficulty by the addition of a chick-drawer under the machine, by means of which the chicks can be removed as fast as they are hatched without opening the door of the incubator. The location of the drawer is such that it is very easy for the operator to take the chicks out and remove them to the brooder. The chicks fall direct from the tray to the drawer. By the system of heating and ventilation used the drawer is always warm; the chicks do not drop from a temperature of 103 to one of 70 degrees, but rather to one of 90 to 95 degrees, and if the brooder should not be ready for the chicks they can be kept in the incubator drawer and fed and watered there.

The lamp stand is metal and is hung on metal hooks, making it very secure—easy to handle and perfectly safe. The bottom and sides of the lamp are made of one piece, the top is crimped on and carefully soldered, and then the whole is galvanized after it is completed, making leaks impossible.

These incubators are made in several sizes, from 50 egg capacity for family or fancier use, to 350 egg capacity for farm use. The one shown here is a 100 egg capacity machine, 37½ inches long, 22 inches wide and 30 inches high.

COMPRESSED AIR PROCESS IN APPLYING PAINTS, ENAMELS, ETC.

In a recent issue the attention of our readers was called to the benefits to be derived by the use of a pneumatic sprayer or air brush, for applying all manner of paints, lacquer, japan, enamel, etc. The manufacturers of this machine are devoting a great deal of study to all classes of metal work in all manner of finishes, using great care and judgment to equip each sprayer they send out with the most suitable nozzle for the particular class of work for which it is intended.

In many cases these machines have been known to make a saving for the manufacturer of from 50 to 90 per cent., seldom saving less than 25 per cent., and as a rule doing superior work with fewer coats of material, for the reason that the latter is blown on perfectly smooth, going into ornaments and corners without any streaks or blotches. One of these compressing and spraying outfits was recently installed in the works of a large tea tray company in Newark, N. J., to be used for finishing trays, electric reflectors, etc., in japan and enamel, and also doing lacquer work. Where two coats of enamel had been required by brush and two days consumed in applying same, the spraying machine is said to be giving a much superior finish in one coat.

The superiority of dead black lacquer work is something which must be seen to be appreciated. White or delicate colors may be applied direct on black iron without dragging the dirt from the iron and soiling the first coat, therefore it is possible to finish this class of work with one coat also. One large New York concern which has been using these machines for some time stated that, with one operator working three days a week, more work is turned out than was formerly done with five hand operators working six days a week.

The manufacturers of these sprayers, the Eureka Pneumatic Spray Company, of New York City, make three sizes of the machine, and they can construct each size so that it is adapted to any required need. The larger sizes are very popular for use on structural iron work, railroad cars and other large surfaces. The feature of this machine is the automatic means by which it will keep the heaviest pigments or bronze stirred while using. The top may be removed in an instant for filling and cleaning, without the necessity of undoing a union, as is required in most other makes of these machines. The sprayer is made entirely of brass, with a seamless reservoir, and is free from packing or washers.

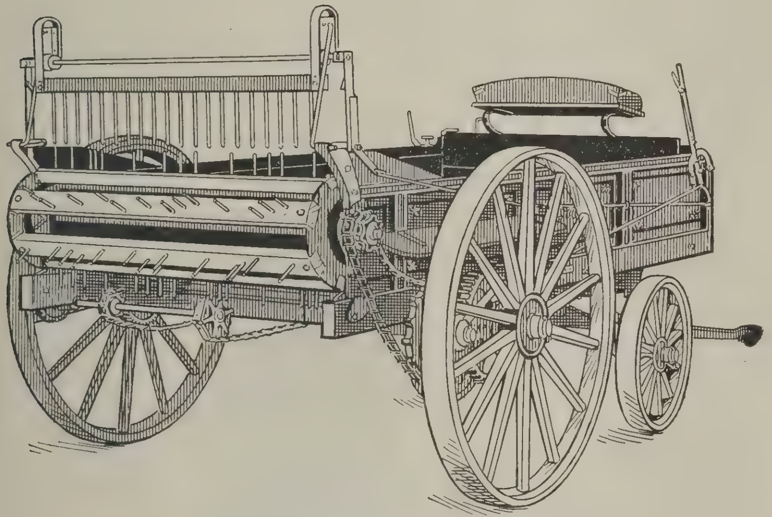
The construction of the machine is simple, but it is strong and remarkable for its lasting qualities. Many of these sprayers have been in use for as long as six years and are still in good condition. Manufacturers of electrical goods and machinery have found them invaluable in painting and japanning their machinery, as well as for applying the japan finish on switchboards, etc.

This concern will shortly offer its new "Record" air brush sprayer, which is designed for delicate finishing and blending on art metal work and novelties.

To increase the facilities for handling its rapidly increasing business, the Hildreth Motor and Pump Company, Lansing, Mich., the well known manufacturer of iron pumps, marine motors, mill supplies, etc., has recently made some extensive improvements in its plant. The capital stock of the concern has been doubled, and the name of the company changed to the Hildreth Manufacturing Company, under which style the business will be conducted in future. The capacity of the plant has been increased by one-half, and while the company will continue to manufacture the same line of products as heretofore, and on a much larger scale, it expects to devote especial attention to the production of marine engines. Its marine motors have already won wide recognition for their high efficiency and reliability, and the company is anticipating a very large foreign and domestic demand for its 1907 models.

MODERN MANURE SPREADERS.

The Eastern farmer needs no argument to convince him of the value of a manure spreader, but the Western farmer, whose soil is rich, may have some doubt as to the results that may be secured by the use of this important farm tool. Where manure is distributed by hand it will tend, on the rich soil of the West, to do more harm than good, for two reasons: First, if the season is wet the small grain crop will lodge, the yield will be decreased and the quality lowered. Second, if the season is dry the manure will burn out the crop. These conditions are produced because of the fact that it is impossible for the farmer to spread manure by hand thinly and evenly enough to secure the best results. The distribution of manure by hand means the spreading of from twenty to fifty loads to the acre, while with a manure spreader as little as three loads of manure can be distributed to the acre, and if the manure is well rotted the distribution is so even that every square inch of ground is covered. In addition to this, the manure spreader economizes labor more than any other farm tool.



MANURE, LIME AND FERTILIZER DISTRIBUTER.

In the accompanying illustration is shown a typical example of a thoroughly modern spreader. It is a strong and substantially built machine and embodies all the improved features known in this class of machinery construction. The front end-gate of the machine forces the feed to the revolving cylinder and spreads the last part of the load as evenly as the first. The apron is moved by means of a worm and gear, which is driven by a strong, heavy gearing and makes a powerful and positive feed. The speed of the apron is changed from the driver's seat without stopping the team so as to spread any quantity to the acre. In turning or passing over places where no manure is required, the movement of the apron can be stopped without throwing the whole machine out of gear. The apron is automatic in action and returns to place ready for reloading. It returns in driving about 60 feet.

The rake of the spreader serves two purposes. Before beginning to load it is dropped in front of the beater in a perpendicular position and prevents manure from packing against the beater. The arrangement of the rake is such that it prevents a bunch of manure being rolled off at the start, and also breakage, as the beater is free and ready to start. There is never any possibility of manure becoming packed against the beater. When in the field ready to unload, the rake is raised to a perpendicular position over the beater by a lever at the front end of the machine and at the same time throws the beater mechanism in gear. By the rake being in this position it combs the top part of the load. When the beater catches a large chunk of manure, instead of throwing it off in a bunch it strikes the rakes and drops back on the beater and is torn to pieces. The rake is mounted on loop springs so as to yield in case of a hard strain.

The frame of the machine is made of white oak, and is held together by truss rods; also two rods across the frame diagonally so as to hold it square. The apron runs on three sets of roller bearings, and works backward or forward with perfect ease. All castings are heavy and well proportioned, and all parts on which there is a heavy strain are made of malleable iron. The wheels are heavy and strong enough to withstand almost any strain.

The machine is driven by both rear wheels and the draft is exceedingly light. The front wheels do not track with the rear wheels: the former are four feet apart and the latter six feet apart.

The manufacturers, the Cedar Rapids Implement Works, of Cedar Rapids, Iowa, make this spreader in wide and narrow styles. The former are fifty-four inches wide and fifteen inches deep and are built in the following sizes: No. 1, 50 bushels; No. 2, 70 bushels, and No. 3, 100 bushels. The No. 1 narrow machine is built of the same material, castings, etc., as the wide style. It is the same length as the 70 bushels wide machine and is forty inches wide. The capacity of this machine is nearly the same as the 50 bushels wide machine. The narrow machine is fitted regularly with the same wheels as the wide style.

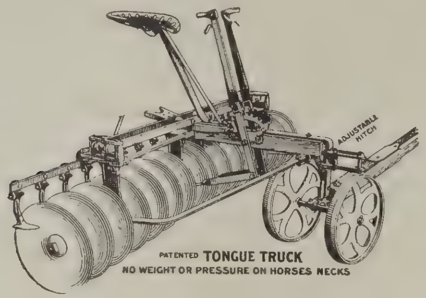
The manufacturers also furnish 40 inch rear wheels for the narrow machine when required, if a low down machine is wanted. This machine is built for those who wish to back into narrow barn doors or sheds.

All of these machines are equally efficient in distributing manure, lime or fertilizer.

The York Manufacturing Company, York, Pa., reports that it is having a very large call at present for its refrigerating and ice making machinery. Orders for the installment of large ice making plants have been received from all parts of the country as far West as the State of Utah. Important installations have also recently been made in various parts of Cuba.

MODERN DISC HARROW IMPROVEMENTS.

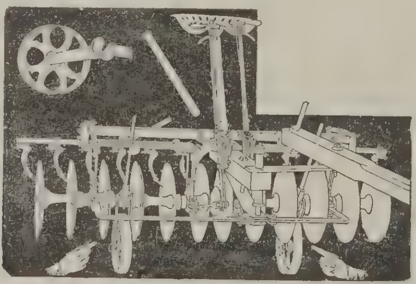
The demand for disc harrows during the past twenty years has continued to grow in every agricultural section throughout the world. One feature of these machines which in the past caused more or less trouble was that the tongue pulled down heavily on the horses' necks. This tendency of the tongue to be pulled or thrown from side to side, caused by the disc harrow striking obstructions in rough plowed ground, made the strain on the horses severer than almost any other work on the farm. To overcome this serious objection, Fetzer & Co., of Middletown, Ohio, have recently invented a tongue truck disc harrow, a cut of which is shown herewith.



DISC HARROW WITH TONGUE TRUCK.

This tongue truck invention is said to have other important advantages over the tongueless style of disc harrow in that the tongue is used to guide and steady the machine; it also prevents the horses getting back into the discs and cutting their feet, and in going down a hill or incline, in moving on the road, it is impossible for the machine to run on to the horses.

Another feature of modern invention in disc harrows is a transport truck, an idea of which may be obtained from the accompanying illustration. This transport truck is said to cost but little, is very easily put on or taken off, and it prevents the discs from wearing out in moving the machine over the hard road or stones, which otherwise has a tendency to dull or bend the edge of the discs.



DISC HARROW WITH TRANSPORTING TRUCK.

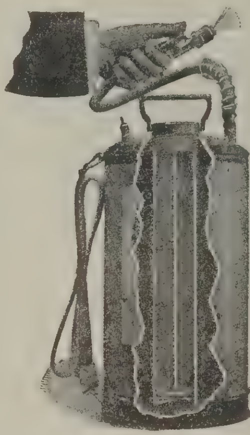
The above are only a part of the extensive line of farm machinery manufactured by this concern, which is one of the oldest and largest in the United States. In addition to their disc harrows, their grain drills, transplanters, potato planters and diggers, corn drills, etc., are all much used both in this country and abroad.

COMPRESSED AIR SPRAYING MACHINES.

The enormous saving in time and labor, to say nothing of the big increase in crops, which results from the systematic and proper use of spraying machines has made these devices of inestimable value to farmers, horticulturists and nurserymen.

Aside from the efficient work they perform, the remarkable features about these machines are their simplicity of construction and the ease with which they can be operated. The one illustrated herewith is characterized by features of superiority that have won for it almost universal favor. It sprays fruit trees, potatoes, vegetables, tobacco and cotton, and is equally well adapted for wagons, windows, henhouses, fires, disinfecting, etc. It is now being successfully used for all these various purposes, and its sale in both this and foreign countries is a large and rapidly increasing one.

The method of operating the machine is very simple. A few seconds' working of the air pump thoroughly agitates the solution and charges the sprayer with compressed air. This being a very powerful and elastic force will, as soon as the thumb presses the "shut-off," force out the liquid in the form of either spray or a solid continuous stream, as desired. A slight pressure of the thumb starts the spray; when the pressure is removed the spray stops instantly.



COMPRESSED AIR SPRAYER.

In the manufacture of the machines, the makers, the Rochester Spray Pump Company, of Rochester, N. Y., have produced two different styles, one having a body of galvanized steel, and the other of polished brass. The top and bottom of the sprayer are dome shaped and joined to the body under heavy pressure. The body is supported and further strengthened by a heavy steel band around the bottom. The air pump is made of heavy brass two inches in diameter. The hose couplings are solid brass, with cut threads, and the ends heavily ribbed to prevent the hose from slipping off. The hose is supported by a coiled spring, bell-shaped at the outer end to prevent breaking. A safety valve is provided to allow air to escape after the necessary pressure has been

SHOWING METHOD OF OPERATION.

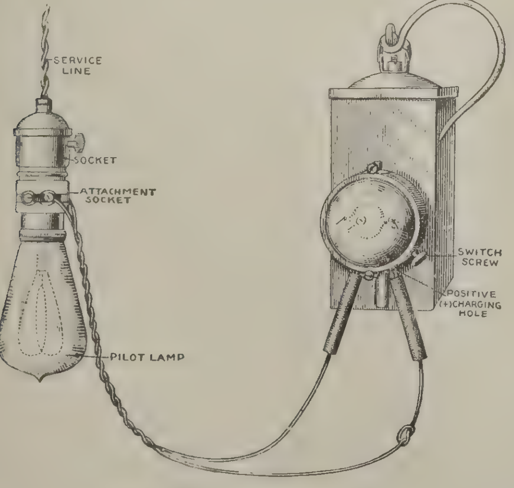
obtained. If a continuous spray is desired a half turn of the thumb pin locks and keeps it in position, and the spray runs continuously until the charge is exhausted. The nozzle is an especially noteworthy feature. It makes two bell sprays of different size, volume and fineness; one flat spray and two sizes of straight streams.

After the sprayer is charged it can be operated just as rapidly as one can walk. It is so constructed that it never becomes clogged, and the nozzle can be cleaned without stopping the spray or removing the nozzle from the tree. The machine holds between four and five gallons, and can be carried either by carrier strap or air pump handle.

AN ELECTRIC SAFETY LANTERN.

Users of portable lights will be interested in the electric lantern shown in the accompanying illustration. It is rather an innovation in its line, being constructed on new principles, and it embodies features of advantage that make it adaptable for a wide diversity of uses. It is equally well suited for use in mines, gas houses, garages, grain elevators, mills, factories, etc.; in fact any place where an absolutely safe portable light is required. To the automobilist this lantern affords an ever ready, safe and handy light for examinations, and in an emergency it can be used to spark gas engines for a considerable time. Around garages, motor boats and yachts it is of especial value, as its construction is such that it cannot cause fire or explosion.

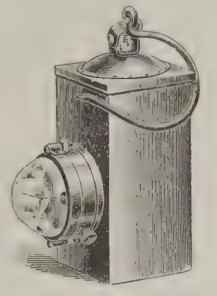
The device, which is the product of the Portable Electric Safety Light Company, of Newark, N. J., is simple in construction, but is substantially built and very durable. It gives a strong light, is perfectly safe under all circumstances, and in operation is economical in the consumption of fuel. Mine gases cannot be ignited by it, and wind and water have no effect upon it; in fact, the lantern may be submerged without injury. Owing to a special form of lock nut, the cover cannot be opened without a special tool.



METHOD OF CONNECTING THE BATTERY FOR CHARGING.

The lantern consists of a 4-cell alkaline storage battery in a steel case. It is 3 inches square by 6½ inches high, and weighs 5 pounds. The reflector contains a special metallic filament incandescent lamp bulb on patented supports, all protected from dust and water, and furnishing a steady 4 candle power light.

One of the illustrations shows the simple arrangement for connecting one battery or several, to any direct current lighting service for charging. The lantern furnishes a strong, steady light for twelve hours on one charge, and, notwithstanding its greater light, it is as easily and more economically operated than an oil mine lamp. The use of the alkaline solution makes the lantern odorless, free from corrosive liquids and vapors, and keeps all parts bright and clean.



ELECTRIC LANTERN.

NEW MOLD FOR MAKING SILLS, CAPS, ETC.

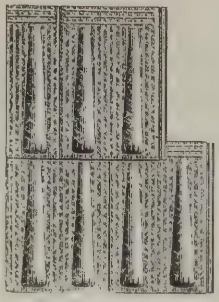
The Cement Machinery Company, Jackson, Mich., has just placed on the market a sill, cap, lintel and step mold that is meeting with much favor wherever introduced. It is very practical and has some new and important features not common to other machines of this character. It is adjustable to different widths and lengths. and in this respect is said to differ from all other molds on the market. Its adjustment runs from 6 feet down to 1 inch in length and from 14 inches down to 3 inches in width. It is furnished in heights of 7⅞ inches or 9 inches, whichever the user desires. Only the best materials are used in its construction, and it is reinforced in such a way that it is impossible to spring it. The side is arranged like a rule, so that any length desired may be obtained in an instant by simply sliding the sides the proper distance. The width adjustment is arranged in the same way.

The company is now preparing printed matter, giving illustrations and full details of this mold, which it will be glad to send to anyone interested.

A report from Consul J. C. Caldwell, of San José, shows that the cement imports of Costa Rica in 1906 were double those of 1905. Belgium's sales advanced from 63,220 to 351,498 kilos (kilo, 2 1-5 pounds); the United States' sales from 261,085 to 477,278 kilos; Germany's sales from 683,349 to 1,194,650 kilos; while Great Britain's shipments dropped from 91,361 to 81,273 kilos.

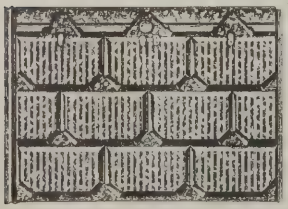
POPULARITY OF THE METAL SHINGLE.

In selecting a roof, no matter for what kind of a building, or in what country the structure is to be situated, there are three things which are always taken into consideration, namely, cost, wear and appearance. Perhaps in no form of roof covering are these three factors more advantageously combined than in metal shingles, and the wide extent to which these are now used, and the rapidly increasing demand which prevails for them in all parts of the civilized world, are strong manifestations of the satisfaction which this style of roofing gives.


VICTOR TILE.

While the first cost of the metal shingle may be in excess of wood, slate, and other materials, this feature is more than offset by the fact that there are no subsequent repairs to be made, and when properly applied the average metal roofing will last a lifetime. In appearance, too, the metal shingle has much to commend it, as any effect can be produced by the color of the paint used.

The illustrations shown herewith represent types of a metal shingle that has met with marked favor wherever it has been introduced. In the selection of material, the manufacturers offer three kinds of material for the builder to choose from: tin, representing the highest grade sheet iron or steel plates protected from rust by a coating of tin and lead by dipping; galvanized iron, with a protective coat of melted zinc which is put on by dipping; and copper, which is practically indestructible. A roof made of copper will last indefinitely, and never need attention of any kind, provided it is put on right. Its action by expansion and contraction being fifty per cent. greater than iron, close or soldered seams should not be used. An important feature of the shingles shown here is their telescope side lock. By means of this useful invention for roofing purposes, each shingle is permitted to expand or contract independently of all the others, and it also prevents the least moisture from reaching the interior of the building.


"EASTLAKE" METAL SHINGLE.

In the manufacture of this roofing, the most exacting care has been exercised by the manufacturers to produce a shingle that will meet every requirement demanded of it. A careful selection is first made of the material; each sheet is then properly squared, after which they are put on an embossing machine, on which one of the several designs put out by this concern, the Montross Metal Shingle Company, of Camden, N. J., is stamped. The object of embossing is not merely for ornamental purposes, but it is done principally to overcome the objection to plain tin roofing rattling or pulsating during high winds. The embossing strengthens the roof, does not add to its weight, and effectively overcomes this objectionable feature. After being embossed, the plates are dipped by hand in a bath of tin and lead or zinc, as the case may be, each shingle separately. The object of dipping after embossing is to remove any possibility of sending out plates containing cracks that might be caused by the die of the embossing machine cutting through the coating.

The shingles are fireproof, and are said to never get out of order. Another important feature is their weight, which is only about one-eighth the weight of slate. This permits of a lighter framework being used under it, and amounts to a considerable saving on the cost of the finished structure.

FRENCH DRY BATTERIES.

A dry battery cannot be better than the formula under which it is prepared except as the quality of the material which is employed may improve the results to be obtained. The principal difference in the various types of dry cells now upon the American market is found in the quality of zinc, carbon, manganese, sal-ammoniac and other material of which they are composed, and these are responsible for the diversity of results with which all users of batteries are familiar.

The first dry battery is said to have been produced by a French scientist, and France is still leading the world in the science of chemistry and excellence of its battery production. One of the largest makers of dry batteries in this country, the French Battery Company, of Madison, Wis., make all of their batteries under advanced French processes, and their products have proved the claim for them that they represent the highest efficiency in dry cell production. So highly do the manufacturers recognize the necessity for the use of the best raw material obtainable that all essential ingredients in their cells are imported from France, and are especially adapted to the process employed in their manufacture.

The manufacturers claim to be in position to adapt their cells in any way that may be desired. They are now manufacturing four different types of the standard cells (2½x6 inches), showing an amperage of from 12 to 15 up to 35 to 45.

The excellence of these cells has won for them widespread popularity; their efficiency and recuperative power have been tested out by the largest consumers in the United States, and the demand for them has become a large and steadily increasing one.

The company has recently organized an export department, and in order to facilitate the establishment of new connections in Central and South America has issued a catalogue in Spanish, in which are described and illustrated the various products of its manufacture.

American varnish is now finding its way into all parts of the world. In 1906 the total varnish exports were 928,342 gallons, valued at $919,237.

POWER FOR MERCHANT CRAFT.

By James A. Charter, M. E.

The above subject has lately been receiving more than ordinary attention, as it has long been felt among owners of small craft that a more economical and reliable power could be had than the present steam power; for instance, such as the internal combustion engine. Until recently, however, manufacturers have not given the subject sufficient study to be entirely familiar with the requirements, and the result has been that many of the so-called marine motors of the internal combustion type have been far too light to stand the strain of the severe and constant service for which they were required.

Lately the subject has been taken up with a view to constructing an engine especially designed and built to meet the most severe conditions and requirements, and the result has been highly satisfactory, as many of these new type motors have been subjected to service of the most severe nature for the past two years, one company having made a test of the reliability of a small sized twin screw craft equipped with two 50 horse power engines, installed on a cod fishing boat which ran to Alaska and was gone from port for a year, and so satisfactory was the service that upon its return a larger twin screw boat was built and equipped with two 75 horse power engines.

This engine was then tried, with the result that a third boat was built and equipped with two 100 horse power engines. These three boats have been kept in constant service with practically no delays or accidents, thus showing that a properly designed internal combustion motor can be relied upon as safely as the old and well known steam power equipment, as the engine itself has been designed and constructed heavy enough so there is no fear of failure in the engine. There is also much less to keep in repair, as disposition has been made of the most uncertain part of the equipment when the boiler is dispensed with, together with the other accessories necessary to go with it.

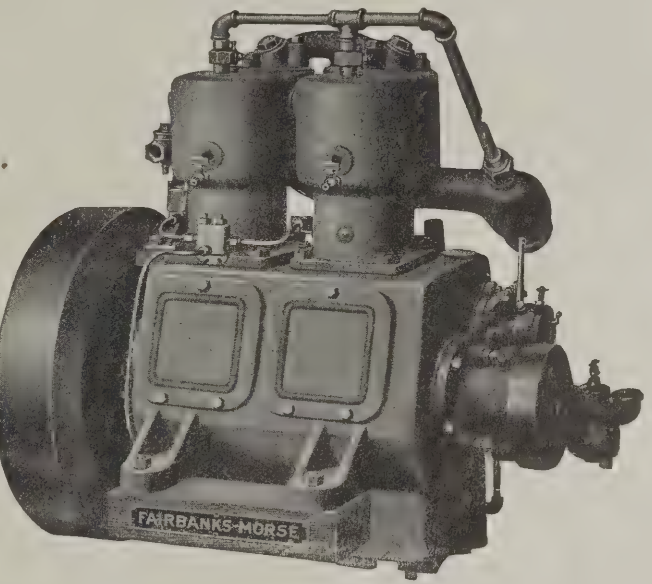
These motors are constructed on the lines of that shown in the cut herewith, which shows the multiple cylinder equipped with reversing mechanism constructed with and forming a part of the engine frame. The connection between the engine and the propeller shaft is effected by means of an expanding friction clutch, and is so arranged that when the motor is connected to the propeller shaft the reversing gear revolves with the shaft, all gears standing stationary and the weight of the parts acting as the flywheel.

When the lever is placed in a neutral position the propeller is disconnected and the engine can be run independently. By throwing the lever in the opposite position the reversing gearing is brought into action and the propeller is driven in the reverse direction or such as to give the vessel a back up. On account of the engine being under motion the handling of the vessel is more certain, and, if anything, more rapid than in the case of steam, where the engine must first come to rest before it can be reversed.

The engine is fitted with a governor, which works on the throttling principle and prevents the engine from racing if the load is suddenly thrown off or if the screw should get out of water, as is often the case in a rough sea.

These engines are built to use gasoline, alcohol or kerosene, and can be specially fitted to use any of the three fuels in the same engine without alteration, thus permitting the use of the fuel which can be purchased at the least cost.

The ignition of the charge in the cylinder is effected by means of an electric spark produced from a mechanically operated electric igniter. These igniters are under control of a timing or adjusting lever, permitting the advancing or retarding of the ignition to suit the speed at which the engine is operated.



TWO CYLINDER, NINE HORSE POWER MARINE ENGINE.

The quadrant lever is attached to the governing mechanism and controls perfectly the speed of the engine between very wide ranges of minimum and maximum, thus making it possible to navigate in strange waters as easily and safely as could be done with any other class of power, and when laying at anchor temporarily the engines can be kept under slow motion available for immediate starting; or when a stop of some duration is to be made the engines can be shut down and upon signal can be started without difficulty in a remarkably short space of time by means of compressed air.

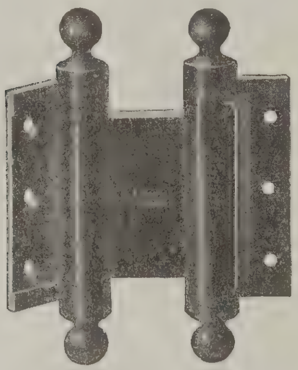
These engines are used in the States extensively on shallow draft craft, where a stern wheel becomes necessary. The connection is made from the fore and aft shaft by means of a worm reduction gear terminating with the cross shaft from which the stern wheel is driven. The same reverse mechanism is used, and screw is also used in connection with the stern wheel outfit.

Boats of this class are built in large sizes used for towing, as well as general freight work, in shallow streams against swift currents.

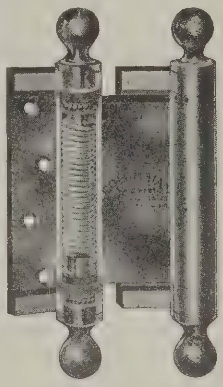
Through the kindness of Fairbanks, Morse & Co., of Chicago, we are able to illustrate herewith a cut showing their light type of modern motors, more especially designed for motor boats and light craft. Those who are interested in this class of power can obtain full and detailed information upon application to the makers.

EFFICIENCY OF THE MODERN SPRING HINGE.

The origin of the spring hinge dates back to a comparatively early period, but the present day hinge has little in common with the styles turned out only a few years ago. Extensive improvements have been made from time to time by manufacturers engaged in the production of these devices, so that the present types of spring hinges represent a degree of perfection that leaves little or nothing to be desired.



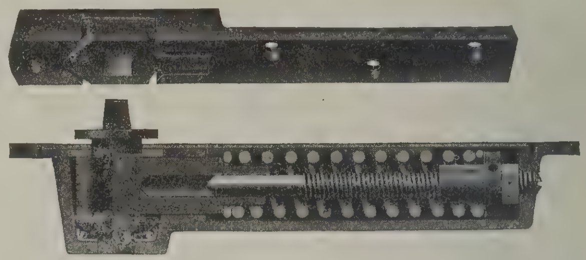
"WROT STEEL" SPRING HINGE.



BALL BEARING SPRING HINGE.

The characteristics of the well-made modern hinge are its rigidity, strength and smooth, easy action. A jamb spring hinge must be rigid and substantial to withstand the constant strain to which it is subjected, to sustain the heavy weight of the door without warping, and to swing the door smoothly and steadily.

The hinges shown in the accompanying illustrations represent types which embody the highest known efficiency in spring hinge construction. Their makers have been engaged in the manufacture of these specialties for nearly fifty years, and were the originators of the double acting spring hinge, which they put out under the name of the "American." This is an extra heavy hinge made of cast iron, and is especially adapted for hard usage on such buildings as banks, libraries, school houses and other public buildings where the doors are constantly in use. They also make a lighter weight cast iron hinge, which they style the "Gem." This latter hinge is for lighter work, for inside doors, but it can also be used or heavy work without straining in the least. In 1903 s concern, the Columbian Hardware Company, of Cleveland, Ohio, produced the "wrot-steel" hinge shown herewith. This hinge is made entirely of steel. The center flange, on which there is a great deal of strain, is a tower of strength to the hinge, as it is seamless, and being so makes a solid, substantial foundation to start building the rest of the hinge.



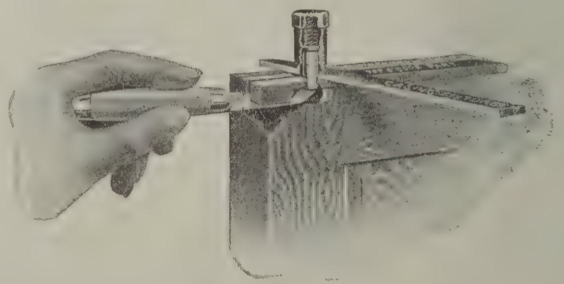
FLOOR HINGE—SECTIONAL VIEW. ALIGNMENT ADJUSTER SHOWN ABOVE.

The side flanges are heavily reinforced at both ends to prevent sagging of the door or warping of the hinge. The bearing surfaces are all smooth and work with practically no friction. The tips are turned by automatic machinery from solid bar stock. The long, evenly coiled springs of oil-tempered spring wire work smoothly and positively, and swing the door back into place from any angle.

Shortly after the introduction of the "wrot-steel" spring hinge, the company brought out its ball-bearing "wrot-steel" spring hinge and ball-bearing floor spring hinge, the excellence and efficiency of which have brought them into almost universal use.

The ball-bearing, "wrot-steel" jamb spring hinge is practically the same as the previously described steel hinge, but it is supplied with ball-bearings which give the hinge an easier and smoother movement. This ball-bearing feature is especially adapted to solid bronze and brass hinges, as the soft metal wears away quickly and allows the door to sag and scrape along the floor.

The ball-bearing floor spring hinge is practically invisible, as it sets in the floor, and only the top plate, which is handsomely finished, is visible. This hinge has no side plates to disfigure the door. The top-pivot is said to be an exclusive feature of this hinge, and it is so arranged that the door can be removed in ten seconds without so much as removing a single screw or releasing the tension on the spring. It is furnished with an alignment adjuster, and has the hold-back feature when open to either 90 or 140 degrees. This hingle is said to represent the highest embodiment of spring hinge perfection.



TOP PIVOT OF FLOOR HINGE. SIMPLE METHOD OF REMOVING A DOOR.

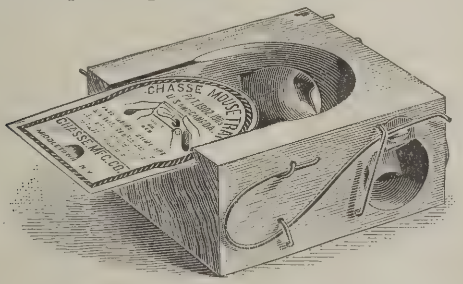
In addition to the strong demand which has been created throughout this country for these products the company enjoys a very large foreign trade, and its facilities for handling export orders are of the very best. Catalogues are issued in both French and Spanish, in addition to an English catalogue, and these are very attractively and comprehensively gotten up. The complete set of catalogues, which describe the company's entire line of hardware specialties, may be had by anyone making application for them.

THE LATEST MOUSE TRAP.

The manufacture of rat and mouse traps is quite an industry in the United States. It is estimated that of all the traps used in the world over 90 per cent. are of American manufacture. Millions of traps are shipped abroad annually, and the sale keeps up with the increase of population. Rat and mouse traps are used everywhere. In some European countries more densely populated than ours, where every inch of the ground is cultivated and where rats can do comparatively more damage than here, a small bounty is given for their destruction.

Not only in fields but in warehouses and many other places the damage and destruction done by rats and mice is considerable, and there is constant warfare on them all over the world, with a corresponding demand for traps. Inventors of such devices have placed a great variety of styles on the market, all of which have been adopted more or less, and there is still a large call for the time-honored trap familiar to many generations of people, known in the trade as the choker trap, this being the ancient mouse trap, with its wood part stained red, and with holes in the sides for the mice to put their heads through to get at the bait attached to the trap's trigger.

In the accompanying illustration is shown a comparatively new trap, the product of the Chasse Manufacturing Company, of New York, which is meeting with much favor wherever introduced. It possesses several important features of advantage over the old style choker, being easy to set and to bait, requires no scalding or washing to keep it clean, and in use is unfailing in action. In construction it is very simple, and from the accompanying cut the easy manner of baiting the trap will be seen. The cover is merely slid back and the bait dropped on the bottom of the well.



NOVEL MOUSE TRAP.

The manufacturers make the traps in two sizes, known as No. 1 and No. 3. The former has one hole and measures 1¼ x 1½ x 2⅞ inches in size. The No. 3 trap has three holes and is somewhat larger than the No. 1 size.

THE BEGINNING OF MECHANICAL VENTILATION AND HEATING.

The history of heating and ventilating engineering in this country commences with Joseph Nason, who upon his return from England in the latter part of 1842 began the introduction into this country of the Perkins system of hot-water heating, with which Mr. Nason was thoroughly familiar, having been for some years, while in England, in the employ of Mr. Perkins.

In 1846 a radical departure in the method of heating—in this country at least—was made by the warming of the Boston custom-house by means of mechanical propulsion of air. A large coil of three-quarter inch pipe was massed in the basement, and from it to the several registers were run ducts of sufficient capacity to carry the warmed air. This plan of warming, while not new in France, was entirely novel in this country, and was the beginning of all subsequent systems in which fans were employed for distributing air.

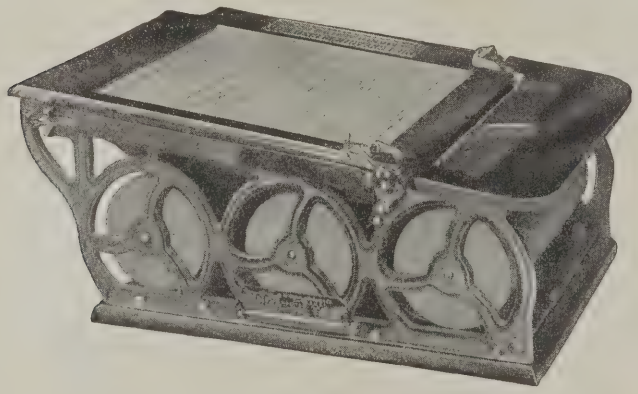
In 1855, in which year extensive alterations of and additions to the United States Capitol at Washington were in progress, Mr. Nason, at the request of General Meigs, then in charge there, went to Washington and planned a system of ventilating and heating for the Capitol. This was the first really scientific and complete work of the kind done in this country. The apparatus installed under Mr. Nason's direction consisted primarily of a heating surface of wrought-iron pipe, over which air was forced by means of two specially designed centrifugal fans, and conducted through ducts to the rooms to be heated and ventilated.

This plan of having a large amount of heating surface located in one place and the air blown through it, the heated air being then conducted to such places as it was needed, was for some years the favorite mode of heating. In the late fifties B. F. Sturtevant began his work in Boston, which eventually led to his building up the largest blower business in the world, under the name of the B. F. Sturtevant Company. In the course of ten years he developed the blower and its uses to such an extent that it became a recognized factor in satisfactory ventilation. He replaced the United States Capitol fans with others of more modern design, and about 1870 entered the market with a unit combination of fan and steam heater. From the somewhat crude design of that day has been evolved the present type of fan blower heating apparatus to be found in every important public building and in thousands of industrial plants throughout the world.

Bulletin No. 1503, just issued by the Allis-Chalmers Company, Milwaukee, Wis., is devoted to a detailed description of the company's direct connected Reynolds-Corliss engines, which are now so extensively used in factories, flour mills, saw mills, electric light and power plants, ore reduction works, etc. Every special feature is minutely described, and the various parts of the engine clearly illustrated. A copy of this bulletin will be sent to anyone making request for same.

MACHINE FOR MANIFOLDING INVOICES, ORDERS, ETC.

That system is an absolute requirement in a business has become a settled fact, evidenced by the success of those who have properly applied it and the failure of those who have ignored its call. The present method of conducting a business is such a complete departure from that of but a few years ago, caused by actual requirement, that the change has brought to the front ranks systems devised upon an economical and protective basis. The demand which modern business methods have created for ways and means of minimizing the time, labor and expense incident to the operation of a store, shop or factory, has been quickly responded to by manufacturers of office equipment, and the market abounds with devices and machines designed to bring about these desired results. Every department of business, both wholesale and retail, has received attention and satisfactory systems have been devised whereby each particular class of work may be accomplished with ease, convenience and dispatch.



MANIFOLDING MACHINE.

In the accompanying illustration is shown a time-saving device which is adapted to a wide field of usefulness, and its efficiency has caused it to become very generally adopted throughout this and foreign countries. This manifolding machine is made in a variety of styles and sizes, to meet varied requirements. It is arranged to issue two or three copies of a document at one and the same writing, but if more copies are desired sections may be added to the manifolder at small additional expense.

Among the many uses to which this machine is applied may be mentioned the bill of lading or shipping receipt system, whereby there is issued at one writing, without the handling of carbon or stationery, three or four copies of each shipping receipt. The manifolder furnishes an automatic feed, and being supplied with a solid writing surface, the operator is enabled to write clear, legible copies and issue them one after another with great rapidity and perfect ease. As there is scarcely a department where the opportunities so encourage waste and risk when not protected as that of the shipping room, it is evident that the application of such a thorough system is of incalculable value in preventing errors.

City delivery systems are handled in practically the same manner. The manifolder issues at one writing an original and duplicate invoice and a delivery ticket, the latter being made sufficiently narrow so as not to admit of prices and extensions.

For the handling of invoices the manufacturers of this machine, the Egry Autographic Register Company, of Dayton, Ohio, have systems which are thoroughly adapted to all requirements. Invoices, day-book entries and shipping orders can be made on the manifolder at one and the same writing. The writing may be accomplished by the use of a pencil or with ink.

These manifolders can be adapted to systems applicable to packing lists for shipping rooms. With the machine three package lists are issued, one to be sent with each package, one for the office, and the third, bearing the check marks and signature of the packer, accompanies the invoice addressed to the purchaser.

Foundries, saw mills, planing mills, etc., also find much service for the various styles of manifolders, in fact the systems that can be conformed to these machines are so varied that almost any branch of business that requires manifolding of documents can be taken care of.

In addition to its manifolding machines, this concern manufactures record registers of all styles, also duplicating machines and all kinds of manifolding stationery. In this country the products of the company are in great demand, and they are also meeting with increasing favor abroad.

POLITICAL ECONOMY AND PUBLIC LAW.

"The Consular Service of the United States," by Chester Lloyd Jones, just published for the University of Pennsylvania by the John C. Winston Company, of Philadelphia, is a well executed and most meritorious work. It gives a history of the consular service from the time of the American Revolution, pointing out especially the development of its relations to trade. It also outlines the service being rendered at the present time and shows some of the defects in our present consular organization. A study of the systems in use in the chief European commercial nations is also included, to show what has been accomplished there in making the consuls a commercial body and the means adopted for that purpose.

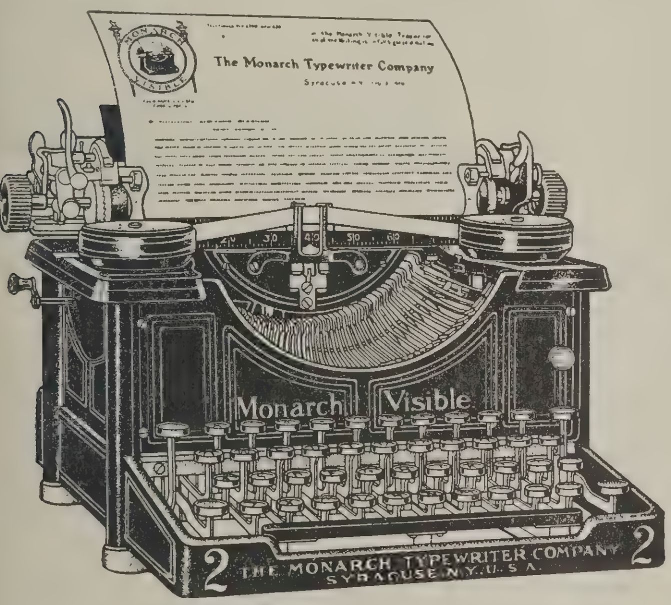
The plan of the book is commendable. It is divided into six chapters, treating in a careful and judicious way on consular organization; rights and duties of consuls; extraterritoriality, what the right of extraterritoriality is and where it may be claimed; consular assistance to foreign trade of the United States; European consular systems; suggestions for the improvement of the American consular system.

The book is an important one, the treatment of the subject throughout being accurate and thoroughly unbiased, and the work forms a valuable addition to the publications of the University in its series on Political Economy and Public Law.

MODERN VISIBLE TYPEWRITING MACHINE.

Advocates of visible typewriting will find much to commend in the machine shown herewith. While comparatively a new product, having been on the market a little less than five years, it has already won for itself a world-wide reputation for superiority and efficiency. Its construction is said to embody every well tested feature of the successful machines of the past, together with new features and principles which it has been found necessary to add owing to the many new uses to which the typewriter is now applied.

The machine is known as the "Monarch Visible," and it is a visible typewriter in the true sense of the word, as its construction is such that no bars or rods in any way obstruct the vision. It has a light, easy touch and quick response, the type bar having a rapid, whip-like action, which enables the operator to do work speedily and accurately and with the least effort.


The Monarch Typewriter Company
Monarch Visible
2
THE MONARCH TYPEWRITER COMPANY
SYRACUSE N.Y. U.S.A.
2

NEW MODEL OF VISIBLE TYPEWRITER.

The firm, rigid carriage of the machine, coupled with the broad, pivotal, frictionless type bar, makes the alignment perfect. This rigid carriage also allows of the manufacture of a smooth, easy running wide carriage machine, used for billing purposes. The manufacturers, the Monarch Typewriter Company, of Syracuse, N. Y., state that their wide carriage or billing machine has proved a success ever since it has been on the market, owing to the excellent work it produces and to the further fact that it is so easy to operate; it requires no more effort to depress the shift key in writing capitals on the wide carriage, taking paper 26 inches wide, than it does to depress the shift key on the correspondence machine, taking paper 9½ inches wide.

The satisfaction which this visible typewriter is giving is evidenced by the fact that nearly all the leading railroads and mercantile houses in the United States and Europe have adopted its use. The company has its own branch offices and dealers in all parts of the civilized world.

These visible machines are equipped with keyboards for any language, and for this reason they are in strong demand, particularly in Spanish speaking countries where special characters and accents are so essential to the turning out of good work by an operator. The sale of the Monarch machine in Mexico is said to have been very large, and the manufacturers state that they are also sending large numbers of them into different parts of South America.

TUNNEL IN GUANAJUATO TO BE CONSTRUCTED BY ELECTRIC POWER.

The Mexican Engineering and Construction Company has the contract and is now pushing the work on the "Porfirio Diaz" tunnel in Guanajuato. This tunnel, which will measure 7 meters wide by 7 meters high, is to pass under the city, and when completed will receive the flood waters from the valleys above the city, thereby preventing any repetition of the recent catastrophe, the tunnel being large enough to prevent any possibility of a like occurrence.

The order for the machinery was given to G. & O. Braniff & Co., who as agents of the Westinghouse Electric and Manufacturing Company, of Pittsburg, Pa., have supplied that make of electrical apparatus, which at present is being so universally used in the various Guanajuato mines. Ten air drills receiving air from two motor-driven air compressors are to be used. The compressors are each 18¼x12¼x12 inches, and the motors will each be of 50 horse power capacity. Two motor-driven exhaust fans are to keep the tunnel ventilated as work progresses.

A 30 horse power electrically operated hoist will be used to haul the loaded cars out of the tunnel on an incline to the dumping ground at the upper end. To perform the work in the least possible time tunneling will be at both ends. At the lower tunnel end the loaded cars will run out by gravity to the dump. The electric power will be taken from the circuits of the Guanajuato Power and Electric Company, and it is believed that with such a complete and thoroughly modern electrical installation only the best results can be expected.

COMPULSORY FENCING IN NATAL.

A bill providing for compulsory fencing throughout the colony, the Northern Territory and Zululand excepted, has been passed in all its stages by the Natal Parliament. For the purpose of assisting owners to fence their property the Government was authorized to raise the sum of $500,000.

Consul-General Richard Guenther advises that a joint stock company for transportation purposes by means of automobiles has been organized at Varna, Bulgaria. This company will transport passengers between that city and the towns of Dobritsch and Baltschik.

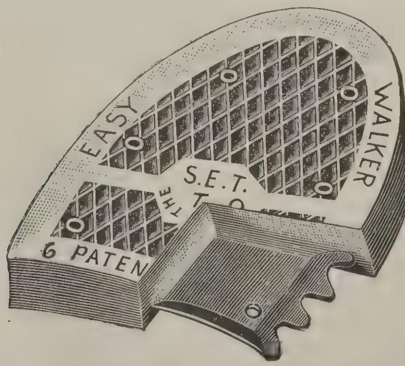
POPULARITY OF THE RUBBER HEEL.

Perhaps no other article of footwear accessories has met with more pronounced favor than that accorded the rubber heel. Each year the number of advocates of this style of heel swells to larger proportions, and manufacturers are kept busy supplying the demand.

The illustration on this page represents one of the most approved and widely adopted heels in use. It has been on the market for a considerable length of time, and has been introduced in practically every country in the universe. In construction it is said to be different from any other style of heel made. Its principal feature is the spring steel heel holding plate. This plate is cup-shaped in form, the projecting fingers having an outward and downward curve. The gum is anchored to this plate by means of vulcanizing the rubber to the plate. On the hollow side, or the side of the heel that is applied to the leather heel seat, the plate appears in the center of the heel. The rubber rand moulded on the lower side of the plate anchors the heel to the plate. The cut herewith shows how the heel is moulded around the holding plate, through which the nails are driven. This plate keeps the heel symmetrical and holds it in position until worn out.

In the manufacture of these heels, which are the product of the Springfield Elastic Tread Company, of Springfield, Ohio, only the best material is used, and every part is made to withstand unusual strain and pressure. The heel is pleasing in design, possesses great durability, and gives to the wearer a sense of much comfort, and of the utmost ease in walking. It is easily applied to a shoe, and fastens so closely and firmly that no water, sand or other substance can get between the leather and the rubber. It can be attached permanently in five minutes without the use of cement or any leveling of the heel seat. It requires but six nails to attach men's heels, and four for women's heels. When the nails are countersunk and clinched, the gum rand is compressed on the edges of the leather heel seat, which makes a water-tight joint.

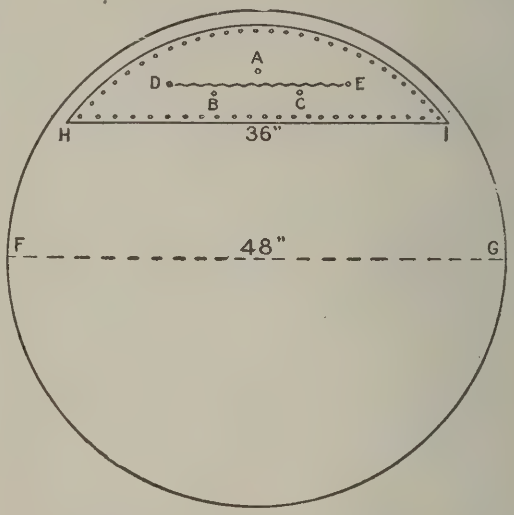
These heels have been strongly indorsed by leading physicians; as for persons troubled with tired and aching limbs, such as hospital nurses, school teachers, hotel waiters and clerks, they are of especial value, the rubber cushion relieving the jar on the spine and giving to the wearer the greatest possible ease in walking.



SECTIONAL VIEW SHOWING HOW THE HEEL IS MOLDED AROUND THE STEEL HOLDING PLATE.

REPAIRING A CRACKED CYLINDER HEAD.

The following novel and effective way of repairing a cracked cylinder head will no doubt prove interesting and instructive to many of our readers. It is a verbatim report of the engineer who performed the work, and it demonstrates very clearly the power and efficiency of some of the cement products now being manufactured for such purposes.



HOW THE REPAIR WAS MADE.

While the cylinder was hot a partial vacuum was created in it, and an elastic cement was painted over the crack. The vacuum drew the cement in and this operation was continued until the crack would take up no more cement. Holes were then drilled and tapped at the end of the crack, D and E, and bolts put in to prevent a further extension of the crack. The patch was cut as represented.

The crack was then painted with Smooth-On, a preparation of the Smooth-On Manufacturing Company, Jersey City, N. J., and the patch laid in position. Then it was carefully removed. The imprint of the crack was now shown on the under side of the patch—the Smooth-On sticking to it. The patch was next dished along the line of the imprint to make a recess to hold sufficient cement.

The plate was then warmed and a compound composed of Smooth-On iron cement and elastic cement, mixed half and half, applied to the warm plate with a small trowel, making a thin, even coating. The next process was to lay the patch in position. The three centre bolts, A, B and C, nearest the crack were brought up just taut. Then the outside bolts were brought up tight, and lastly, the three centre bolts were made as tight as possible, which forced the cement into the crack. Steam was then turned on and the crack was tight and permanently repaired.

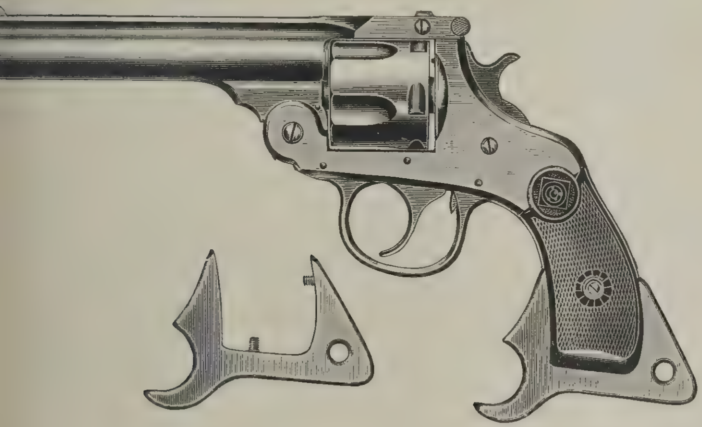
During the year 1906 wheelbarrows, pushcarts and handtrucks were exported to the value of $473,025.

NEW REVOLVER GRIP.

The revolver grip shown in the accompanying cut will no doubt interest many users of this form of firearms. This device has just been brought out by the Harrington & Richardson Arms Company, of Worcester, Mass., whose various styles of revolvers and other forms of firearms are so widely used.

It is a simple, effective arrangement, and combines with a pocket revolver the grip of an army model. The cut clearly shows the construction of the device, and gives an idea of its special advantages. It is as solid and firm as a part of the frame, but can be detached by removing two small screws, allowing the use of the revolver either with or without the grip, as desired. The revolver can be further secured by a ring or thong through the hole in the grip.

Although on the market but a short time this grip has already met with much favor, and the manufacturers report they are having a large call for it. With one or two exceptions it is adapted for use on all of the revolvers manufactured by this company.



REVOLVER GRIP ATTACHMENT.

PACKINGS FOR ENGINES, PUMPS, ETC.

The subject of packing for all places where a steam, air or liquid tight joint is required is one which owners of steam plants are frequently called upon to consider. While the item of packing may in itself be considered of minor importance, the money thus expended may in a year's time amount to a considerable sum, as fuel is often lost or wasted from friction caused by poor packing, the rods becoming worn from such friction, causing expense and delay. There are but few requisites in good packing, and these may be summed up briefly as follows:

Material that will last long; intelligence in putting it together; principle in construction, so that it will make a tight joint without undue friction, and first cost as compared with its lasting qualities. Naturally, the demand for this class of material is enormous, and an almost endless variety of packings of various kinds—hard, soft and metallic—have been manufactured, and many of these are very efficient in fulfilling the requirements for which they were designed. Prominent among the latter is the product put out by the Eureka Packing Company, of New York city, which has now been in successful use for many years. Some twenty years ago it was demonstrated that a flat rubber core of good quality, surrounded by braids of pure flax, with superior lubricants between each braid, had remarkable lasting qualities, and was much less expensive than the average packing being manufactured. It was also found that the rubber core acted as a cushion—padding out all unevenness of rods—making it particularly valuable for worn rods or rods out of line, while for new rods there was nothing superior to it. It was named "Eureka," and during the quarter of a century it has been on the market its good qualities have become so thoroughly recognized that there is now not a country in the civilized world in which it is not used to some extent. It saves waste and time in packing rods, and is easily and quickly placed for use. It is thoroughly efficient and readily adjusts itself to varying conditions and pressure.

THE FIRST ARTIFICIAL ICE PLANT.

The original artificial ice plant established in the United States was in New Orleans in 1866, and the intention of its projectors was declared to be to supply artificial ice in the territory south of the ice line, which is south of the North Atlantic, New England, Middle and Northwestern States. This has long since been accomplished, Galveston and then Houston establishing ice plants years ago. The industry has spread so that there is not a town of any size in Texas or the Southwest but to-day has its ice and refrigerating plant, and one of the strongest and most energetic and progressive trade associations in Texas is that composed of the ice makers. And not only has the making of artificial ice occupied the field south of the ice line; but by degrees ice plants have been established in the territory supplied likewise with natural ice, breweries, hotels, restaurants, packing houses and hospitals having refrigerating plants.

The Hayward Company, 97 Cedar Street, New York, has just issued a neat and comprehensive booklet briefly describing some of its large line of dredges, skid excavators, derrick fixtures, railroad excavators, steel traveling derricks, coal hauling machinery, and orange-peel and clam-shell buckets. Many illustrations are interspersed throughout the book, and it contains information and suggestions of interest to all users of digging machinery. A copy of this booklet may be had by anyone making request for it.

The exports of small wooden ware are largely increasing from year to year. In 1906 wooden ware to the value of $612,778 was exported.

METAL SIGNS FOR WINDOWS AND STORE FRONTS.

The manufacture of display signs for business purposes is naturally an industry of enormous proportions, since one or more of these signs is required by every merchant and professional man, regardless of the size or nature of his business.

For store fronts, offices, window sills, etc., brass and silver plated signs are much used. A brass plate with letters sunk and enameled black, mounted on a wide base with beveled edges, makes one of the most attractive and durable signs that can be made, and the present heavy demand is an indication of the rapidly increasing favor which is being accorded this style of sign. Raised letter metal signs have always been very popular, and to meet varied requirements they are made in any shape, style or size required.

One of the largest makers of office signs in the United States is the N. Stafford Company, of New York, who have been engaged in this line continuously for fifty years, during which time they have established a world-wide reputation for the excellence of their products. In addition to metal signs they make glass, wood, enamel, wire, aluminum, tin and illuminated signs, wire signs with raised letters, and engraved metal plates for all purposes. Their raised letter metal signs are made with solid bronze or brass letters and borders, highly polished and placed on a dark oxidized or polished copper background. They are rich and ornamental in appearance, and owing to the materials of which they are made are practically indestructible.

An attractive and durable show window sign is made of gold glass letters. The letters are concave on the under side and thus form a vacuum, which, together with the special cement used, holds them securely in place. Being concave on the back and mirrored in gold or silver, they show on the front or face side a convex or half round effect, and the mirrored finish is so brilliant that the letters can easily be read at night. The gold is fired into the glass, and is therefore very durable. These letters can also be had in opal or white glass, and they make very handsome signs. For advertising purposes the letters can, if desired, be finished in special colors.

In addition to high grade signs, this concern makes a specialty of large and small sign letters and figures in bronze, brass and German silver, raised letter signs with oxidized copper backgrounds, and memorial tablets with raised or sunk letters in bronze, brass and German silver. The company also has excellent facilities for manufacturing raised letter bronze name plates for machinery, and is in position to make any size or style that may be required. Other products manufactured on an extensive scale are badges, plantation and time checks, numbering machines, check protectors, and a variety of other goods, such as metal and rubber stamps, brass checks, stencils, etc. The new catalogue recently issued by the company describes and illustrates its complete line, and a copy will be mailed to anyone upon request.

MOTOR CARS FOR STRAITS SETTLEMENTS.

As to conditions in Singapore, the Straits Settlements, Federated Malay States, and the islands of Sumatra, Java and Borneo, the motor car trade is yet in its infancy. In Singapore there at at present about sixty passenger machines and some fifteen to twenty freight-carrying lorries. The only representatives of American cars are one or two Oldsmobiles and one or two Reo cars. The balance are entirely English and French in manufacture. This is apparently a fault of American manufacturers, because their deliveries are so uncertain, while with European competitors they are most prompt; a cable being sent for rush delivery is usually followed by shipment by the first boat out. Then, again, the freight rates are too high from the manufacturers' agent's standpoint, and it is practically an impossibility to enter into the market until something has been done to lower rates. In the city of Singapore the cars are all owned by doctors, professional men, and some few motor enthusiasts, and the interest in motor trade grows daily. The field being practically uncanvassed for many years, it has not as yet been thoroughly gone over, nor have the majority of the right people been approached for the sale of motor cars.

The Robbins & Myers Company, Springfield, Ohio, has just issued its 1907 catalogues in English and Spanish, and to anyone interested in direct current fans their contents will prove both interesting and instructive. They describe and illustrate in detail the company's entire line of direct current ceiling fans, desk fans, bracket fans, oscillating desk fans, exhaust fans, etc., and contain many suggestions helpful to users of such appliances.

The products of this concern have by their superior construction, efficiency, and adaptability to a wide field of usefulness, become very well known and the demand for them is a large one. They are designed with reference to the highest possible economy, are perfect in workmanship and design, remarkable for their durability, and in their application to the various uses for which they are adapted they are said to represent the highest known efficiency in electric fan construction. All of the company's products, including fans, motors and dynamos, are put out under the style of "The Standard," under which name they have become known not only throughout this country but in many parts of foreign lands, where the demand for them is said to be rapidly increasing.

Copies of either the English or Spanish catalogue will be mailed to anyone writing the company direct.

The Cyclone Drill Company, of Orrville, Ohio, recently shipped one of its combined core and hollow rod drilling outfits to Wm. Gelder & Co., of New York, for prospecting their property at Tonopah, Nevada, and a similar outfit went to Carlsbad, New Mexico, where a large mineral property is to be developed.

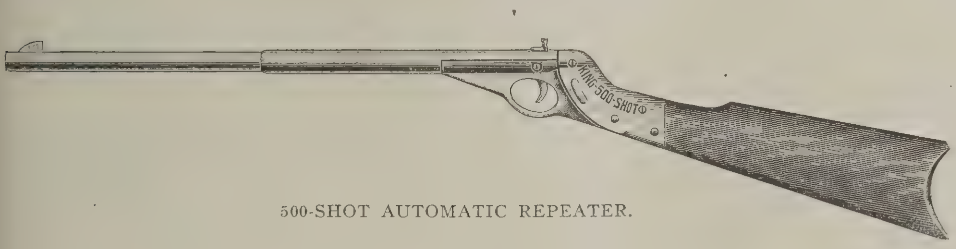
It seems that American trunks, valises and traveling bags come more and more in favor abroad. Last year their exports represented a value of $260,265.

POPULAR AUTOMATIC REPEATING AIR RIFLE.

The air rifle shown in the accompanying illustration ranks as one of the leaders in popular favor in all countries where it has been introduced. It embodies in its construction every meritorious feature requisite in a gun of this nature, being light in weight, pleasing in design, accurate in shooting, and so closely resembles a real gun in appearance that it quickly captures the fancy of every boy.

It is the product of the Markham Air Rifle Company, of Plymouth, Michigan, one of the oldest and largest producers of air rifles in the world. The company manufactures a variety of styles of rifles, capable of meeting every possible demand, all of which are widely used both in this and foreign lands. The 500-Shot Automatic Repeater has been placed at the head of this year's line, and it is said to in every way represent a boy's ideal of a perfect air rifle. It is a hammerless magazine repeating rifle that loads automatically each time the gun is broken down to compress the spring. The magazine holds 500 shot, and each shot is swaged to size as it enters the barrel, thus giving it force and accuracy. The rifle has a nickeled steel barrel, oval black walnut stock and perfect sights. It measures 34 inches in length, weighs 2 pounds, and shoots either BB or air rifle shot.

Other favorite styles of rifles put out by this company are its Single Shot Model D, "King" Repeating Model D, and "Chicago" air rifle. The first of these is a 31 inch gun weighing 1 pound 8 ounces, and it is said to represent the highest standard of excellence in air rifles. It shoots BB shot and darts with accuracy and great penetrating power.



500-SHOT AUTOMATIC REPEATER.

The "King" Repeating Model D is a hammerless repeating air rifle that loads automatically. This gun is a great favorite with boys of all ages. The magazine holds 350 shot. The rifle is light in weight, and shoots with accuracy and force.

The "Chicago" air rifle is said to be the only breech-loading rifle manufactured. The stock and barrel are made from 1¼ inch maple, with mahogany finish. The air-chamber and shooting-barrel are of seamless brass tubing. This rifle is said to be excellent for drills and parades.

American windmills are finding a large market abroad. During the year 1906 their exports represented a value of nearly $500,000.

THE NORTHERN MOTOR EXPOSITION.

Consul E. S. Cunningham reports that July 5 to 14, inclusive, has been fixed as the date for the holding of the Northern Motor Exposition in Bergen, Norway.

Notice of intention of making an exhibit must be filed on proper blanks with the committee before April 15, 1907, as also any information which is desired published in the official catalogue must be supplied by the same date. In a former report it was pointed out that manufacturers other than the Scandinavian to be entitled to compete in the exposition must have a Norwegian agent, but this has been extended to foreign manufacturers having an agent in Norway, Denmark or Sweden. The committee announce their intention of applying to the Government to have exhibits admitted free of duty, as well as asking for reduced freight rates. There has been arranged a meeting of fishermen of Scandinavia to take place at the close of the exposition, and exhibitors will be given a further opportunity to demonstrate the peculiar fitness of their motors and boats for the fishing trade.

MONOPOLY OF MANCHURIAN TRADE.

Of course, anti-Japanese propagandists exclaim that Japan has grabbed for herself a monopoly of Manchurian trade, and is rushing her goods in there to the exclusion of ours. Not so. In the first place Japan has no such monopoly; but has opened the doors of Manchuria to all the world on exactly equal terms. In the second place, it is not in Manchuria that she made her chief gain. Of the increase in her trade in these three years only 16 per cent. has been in Manchuria, while 21 per cent. has been in Northern China, and 57 per cent. has been down in Central China, in the valley of the Yangtse River, which was not at all affected by the war.

It may be of interest to observe that Japan is selling to China more than twice as much as this country is, even including our sales to or by way of Hong Kong. More than any other power Japan has opened the doors of China to our commerce; but we cannot expect her in addition to refrain from trading with China in order that we may not be outstripped. The markets of the Far East are open to us, and if we do not go in and enjoy them it will be our own fault.

A catalogue of interest and value to all users of steam engines and boilers has just been issued by the Atlas Engine Works, of Indianapolis, Ind., one of the world's largest manufacturers of this class of products. The concern's complete line is listed and described, and numerous illustrations are given throughout the book. To any of our readers interested a copy of this catalogue will be mailed upon request.

IMPORTANT HYDRO-ELECTRIC TRANSMISSION PLANT.

The Stanislaus Electric Power Company, through its working company, the Union Construction Company, has just closed a contract for an electric power transmission scheme of extreme importance to California industries. The site of the proposed plant is at Vallicita, on the Stanislaus River, near Angels Camp, Cal., and the scheme contemplates the utilization of the waters of the Stanislaus River, transmitting the power, electrically, to San Francisco, and incidentally tapping the southern mines and the upper San Joaquin valley.

From a hydraulic standpoint, the proposition is of particular interest, as it involves the largest power units that have ever been used for impulse wheels. The operating head is 1,400 feet, equivalent to a pressure of 608 pounds per square inch. The present equipment calls for three 6,700 k.w., 400 r.p.m., General Electric generators, each of which will be driven by a Pelton water wheel unit of 12,000 h.p. capacity. Not only are the individual units larger than heretofore attempted, but the capacity of the station in excess of 3,600 h. p. is said to be greater than any existing at the present time.

The only instance approaching this in impulse water wheel practice is the plant of the Puget Sound Power Company at Electron, Wash., in which are installed four Pelton wheel units, each driving a 3,250 k.w. generator, with a combined maximum capacity for the station of 30,000 h.p.

The units for the Stanislaus plant will be of the "double overhung" construction, characteristic of Pelton design for high power practice. Each unit will consist of two Pelton wheels, each overhanging the opposite end of a heavy shaft which carries the rotor of the generator in the center. Some details of construction covering these immense units may be of interest. The wheels proper each consist of a cast steel annealed disc center, to which are attached the Pelton buckets, also of cast steel. The buckets will be secured to the center by means of turned steel bolts hydraulically pressed into reamed holes—a novel point in water wheel construction. The shaft will be of fluid compressed hollow forged nickel steel, 28 feet in length, 20 inches in diameter at the center where the rotor is located, and 16½ inches at the water wheel journals. The wheels and rotor will be designed for a press fit on the shaft at 100 tons pressure. The journals, one on each side of the generator, will be larger than any heretofore designed for this class of work, being 16½ inches diameter by 60 feet long. They are of the ring oiling, ball and socket type, water jacketed, and provided with an oil pressure and gravity feed lubricating system. Also, there will be furnished electric thermostats and indicators to give warning of any excessive rise in temperature. The nozzles will be of the needle deflecting type, admitting of close regulation and water economy, and be made of cast steel, as will also the gate valves. These latter will be of the single disc type, with phosphor bronze seats ground in place. They will be provided with roller bearings to relieve the thrust on the stems, and will be actuated through gearing by means of small motors. At the switchboard will be located the main pivot control, by means of which the operation of gates, nozzles and needles may be under the immediate control of the station attendant, small motors and direct acting plungers being employed for this purpose. All pressure parts on these units are to be subject to a cold water test of 1,200 pounds per square inch in the shops before shipment. The equipment will represent the highest development in hydro-electric transmission, and the installation is looked forward to with much interest by engineers generally.

This contract is under the direct supervision of the engineering firm of Sanderson & Porter, New York, the complete hydraulic equipment being furnished by the Pelton Water Wheel Company, of San Francisco, Cal., and the electrical apparatus by the General Electric Company. Indications are that the year 1907 will eclipse its predecessor in the development of hydro-electric power transmission. The Pelton Water Wheel Wheel Company reports unusual activity in this direction, and will carry over unfilled orders aggregating the largest in the history of its business. The marked tendency is said to be towards high speed, large power units.

FERRO-ALLOYS.

The Electro Metallurgical Company, which was incorporated about six months ago and began the manufacture at Niagara Falls, N. Y., of high-grade ferroalloys (principally ferro-vanadium, ferro-tungsten and low-carbon ferro-chromium), has just purchased the works of the Willson Aluminum Company at Kanawha Falls, West Virginia. Among the numerous patents acquired from this latter company are those covering the manufacture, use and sale of electrically-produced ferrosilicon, as a product, and the processes applicable to its manufacture.

The Electro Metallurgical Company will continue the operation of both the Niagara Falls and Kanawha Falls works. Additional equipment is being installed, and the capacity of each plant greatly enlarged. During the short time it has been engaged in business, this concern has been successful in building up a large demand for the products of its manufacture, which are all of the highest grade, and consist of a complete line of ferroalloys and other electro-metallurgical goods. Special attention is devoted to the interests of foreign trade, and to facilitate the handling of such business the company has established a branch office in New York City at 79 Wall street. The general offices of the company are located at 157 Michigan avenue, Chicago, Illinois.

Particulars are desired regarding small, inexpensive windmills to pump water for irrigation purposes. These are for use in an Oriental country. Full information regarding equipment, time required to ship orders, terms of sale and price, f. o. b. New York, should be sent to the American consul for the inquirers.

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In Memoriam

WILLIAM JOHN JOHNSTON,

PRESIDENT OF THE AMERICAN EXPORTER.

As this number of the AMERICAN EXPORTER is going to press, Mr. W. J. Johnston, its President, passes away. Without warning, with appalling suddenness, yet peacefully and painlessly the end came late in the evening of Sunday, April 28, 1907, and this indefatigable traveler passed on to that bourne from which there is no return.

The multitude of friends and acquaintances whom he numbered, both at home and abroad, in social and official as well as commercial circles, will join the entire staff of this paper in sorrow at the loss of a genial friend and wise counselor, and in sympathy to the sorely stricken family left to mourn with us.

On the evening of the day mentioned Mr. Johnston returned from a brief visit to Washington on business connected with some of the Government departments, and was apparently in his usual good health and spirits when, as he was bidding his family good-night, the end came almost instantaneously from cerebral hemorrhage.

William John Johnston was for more than thirty years connected with the publication of American trade and class papers, and created for himself an enviable position in that fraternity. Born in 1853, he entered the publishing business while scarcely more than a boy, founding *The Operator*. This was the first periodical in the electrical field, later becoming the *Electrical World*. By dint of untiring enthusiasm, enterprise and hard work, he developed that journal during the twenty-five years it was his property into one of the leading technical papers of the world.

Mr. Johnston had for many years taken a keen interest in the subject of foreign trade and had traveled widely abroad. In 1899 he made an extensive and comprehensive tour of the world, especially to study commercial conditions as affecting the foreign trade policies of American manufacturers and exporters. Upon his return to the United States he devoted his attention again to trade journalism, addressing himself to the foreign consumer of American goods. His interests were at this period centered in *Mining and Metallurgy*, the *Engineering and Mining Journal* and the *Mining Magazine*. During the past two years, as publisher of the AMERICAN EXPORTER, his energies were directed toward the application of his former studies in export trade.

The results of Mr. Johnston's astute business management, aggressive enterprise and far-seeing shrewdness are evident in the extraordinary progress made by the AMERICAN EXPORTER under his control. Expenses, advertising, circulation have all trebled within the past two years, and the new life infused into this oldest of publications devoted to a world-wide export trade has produced results as gratifying to its friends as they were to its President, whose thought and interest were centered in it.

Mr. Johnston was a member of the American Institute of Electrical Engineers, the American Institute of Mining Engineers, the Canadian Mining Institute, the Hardware Club, the Sphinx Club and many other associations of various sorts. In 1905 he was a member of the party that accompanied Secretary Taft to Japan, the Philippines and China, and in 1906 visited South America on the occasion of Secretary Root's trip to that continent.

His unfailing courtesy, friendliness and liberality will long remain a cherished memory to those associated with him in business, and his example as Christian gentleman and as business man will continue in memory the inspiration they were in life.

He leaves a widow and eight children. One of his sons, Mr. Edwin C. Johnston, has been for many years associated with his father in the publishing business, and recently with the AMERICAN EXPORTER as Secretary, Treasurer and Business Manager. Mr. E. C. Johnston now becomes the General Manager of this publication. No change in the policy of the paper from that so wisely and ably dictated by Mr. W. J. Johnston is contemplated. His arrangements for its future have, indeed, been so fully and so capably made that a continuance along the same lines becomes as much a matter of course as it is a proud and sacred duty to the memory of the man whose ability made for its success, and whose personality will be so sadly missed in its offices.

THE SHARE OF THE UNITED STATES IN THE WORLD'S TRADE.

The international commerce of the world now exceeds $26,000,000,000, of which $13,750,000,000 is imports and $12,500,000,000 exports. Of the imports of countries other than the United States, 14⅓ per cent. are drawn from this country, and of their exports 9½ per cent. are sent to us. These statistics, just published by the Department of Commerce and Labor, are based on the latest figures available from each country in the world where records are available, and a large proportion of them relate to the commerce of the year 1905, though in a few cases they are for the year 1906 and in certain other instances statistics for 1904 have necessarily been adopted.

The total value of the imports of all the countries for which statistics are available is set down at $13,739,697,000 and the total value of their exports is set down at $12,496,419,000, these figures of exports including only the domestic products exported and not including the foreign or colonial merchandise brought into the country and re-exported. The total imports of the countries other than the United States are given at $12,513,143,000 and the share of these imports drawn from the United States at $1,798,338,000, or 14.37 per cent. of the total. The total exports of the countries other than the United States are given at $10,778,466,000 and the share sent to the United States at $1,031,113,000, or 9.57 per cent. of the total.

The share which the United States supplies of the imports of the various countries of the world and which it takes of their exports is shown by an examination of the details, and this examination discloses some interesting facts. The country which draws the largest share of its imports from the United States is Honduras, which in 1905 took 73.7 per cent of its imports from this country. Next in rank in this particular is Santo Domingo, of whose imports in 1905 71.65 per cent. were from the United States. Mexico in the same year took 65.99 per cent. of its imports from the United States; Canada, 59.59 per cent.; Nicaragua, 52.09 per cent.; Costa Rica, 51.65 per cent.; Cuba, 45.34 per cent.; Guatemala, 39.55 per cent.; Haiti, 35.56 per cent.; Colombia, 34.15 per cent.; Salvador, 31.18 per cent.; Venezuela, 30.22 per cent.; Ecuador, 28.86 per cent.; Japan, 21.35 per cent.; United Kingdom, 20.45 per cent.; Peru, 17.98 per cent.; the Philippines, 16.8 per cent.; China, 16.68 per cent.; Denmark, 16.08 per cent.; Argentina, 14.1 per cent.; Germany, 13.91 per cent.; Italy, 12.48 per cent.; the Commonwealth of Australia, 11.7 per cent.; New Zealand, 11.21 per cent.; Spain, 11.21 per cent; France, 10.72 per cent.; Brazil, 10.33 per cent.; Chile, 9.92 per cent.; Uruguay, 9.67 per cent.; Russia, 9.66 per cent.; Austria-Hungary, 9.49 per cent.; Netherlands, 9.38 per cent.; Bolivia, 8.45 per cent.; Belgium, 7.98 per cent.; Sweden, 7.22 per cent.; Portugal, 7.13 per cent., and Korea, 6.19 per cent.

Considering the share of the exports of the various countries sent to the United States in the order of the relative share, it is shown that Cuba sends to the United States 86.53 per cent. of its total exports; Mexico, 68.60 per cent.; Santo Domingo, 65.16 per cent.; Colombia, 54.01 per cent; Nicaragua, 53.21 per cent.; Costa Rica, 47.14 per cent.; the Philippines, 36.28 per cent.; Venezuela, 31.11 per cent.; Canada, 30.41 per cent.; Guatemala, 34.9 per cent.; Japan, 29.48 per cent.; Ecuador, 27.32 per cent.; Salvador, 21.72 per cent.; Chile, 15.2 per cent.; Switzerland, 12.90 per cent.; Italy, 11.95 per cent.; China, 11.86 per cent.; Germany, 9.46 per cent.

Considering the export business of the United States for the year 1906 as divided between the different American ports and customs districts, it appears that the rank and the percentage of the total exportations sent through each are as follows:

New York first, with about 35 per cent.; Galveston second, 9½ per cent.; New Orleans third, 8 2-3 per cent.; Baltimore fourth, 6⅓ per cent.; Boston fifth, 5⅔ per cent.; Philadelphia sixth, 4¾ per cent.; Savannah seventh, 3¾ per cent.; Puget Sound eighth, a little less than 3 per cent.; San Francisco ninth, 2¼ per cent., and Detroit tenth, 2 per cent.

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A MEETING OF THE PEACE CONGRESS, APRIL 16, 1907.

Among the speakers standing from left to right are Captain Hobson; Edward Everett Hale, talking with Baron d'Estournelles de Constant; Señor Mendoza; Hon. J. W. Foster; Hon. W. J. Bryan; Hon. Richard Bartholdt; Hon. Seth Low; Hon. John Barrett; Ambassador Creel, of Mexico; Judge Morrow; "Maarten Maartens"; Dr. Richard; Samuel Gompers; Marcus W. Marks; Dr. S. T. Dutten; George Foster Peabody and W. J. Johnston, president of the AMERICAN EXPORTER.

PEACE AND ITS RELATION TO COMMERCE.

A largely attended and enthusiastic Peace Conference closed its deliberations in New York on April 17, after being in session four days. The meetings were held at Carnegie Hall, under the auspices of the National Arbitration and Peace Congress, of which Mr. Andrew Carnegie is president. Delegates were present from practically every State in the American Union, as well as from many foreign countries, including Great Britain, France, Germany, Holland and Mexico.

The United States Government was represented by Secretary of State Elihu Root and Secretary of Labor and Commerce Oscar S. Straus. Hon. John Barrett, director of the Bureau of American Republics, was present on behalf of the twenty Central and South American republics.

Manufacturing interests were represented by Mr. James W. Van Cleave, president of the National Association of Manufacturers. Mr. W. J. Johnston, president of THE AMERICAN EXPORTER, attended the different sessions because he realized the important bearing international peace has upon world commerce.

Nine sessions, three conferences and five receptions or luncheons diversified the work of the delegates. At every session crowds besieged the doors long before the opening hour and late arrivals invariably found themselves obliged to form part of the hundreds who stood in every nook and corner after all the available seats had been filled, or to attend overflow meetings in neighboring churches. The seating capacity of Carnegie Hall, where the principal sessions of the congress were held, is between three and four thousand. The auditorium was beautifully and appropriately decorated for the occasion with the flags of the different nations on a background of white to indicate peace. The representatives of foreign countries who participated included:

Great Britain—Dr. John Rhys, Head of Jesus College and Pro Vice Chancellor of the University of Oxford; the Rev. E. S. Roberts, Master of Gonville and Caius College and Vice Chancellor of the University of Cambridge; Col. Sir Robert Cranston, ex-Lord Provost of Edinburgh; Dr. John Ross, chairman Carnegie Dumfermline Trust; Provost Macbeth, Dumfermline; W. T. Stead, editor *Review of Reviews;* C. F. Moberly Bell, manager London *Times;* Hammond Hall, editor London *Daily Graphic;* Clement K. Shorter, editor London *Sphere;* Sir Robert Ball, F.R.S., professor of astronomy at Cambridge University; Dr. P. Chalmers Mitchell, F.R.S., secretary Zoological Society of London; Sir William Henry Preece, F.R.S., electrical engineer; Mr. William Archer, dramatic critic London *Tribune;* Sir Edward Elgar, musical composer; Edwin A. Abbey, American painter in London.

France—Baron d'Estournelles de Constant, member of French Senate; head of French Section of International Peace Conference; Paul Doumer, chairman of the Senate; J. Rais, secretary of the International Conciliation Committee; Leonce Benedite, director Luxembourg Gallery, Paris; Professor Marcelin Boule, director Museum of Natural History; Camille Enlart, director of the Trocadero Museum at Paris.

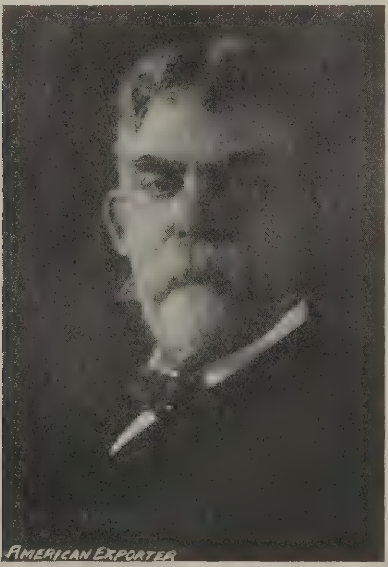
Germany—Friedrich S. Archenhold, astronomer, director Theptow Observatory.

Holland—Mr. J. M. W. Van der Poorten-Schwartz ("Maarten Maartens"), Dutch author and traveler.

So great was the interest felt that two different banquets had to be held in different hotels. In the aggregate over a thousand sat down to dinner. Among those who made addresses were Mr. Carnegie, who presided at one banquet; Hon. Seth Low, former Mayor of New York, who presided over the other; Earl Grey, Governor General of Canada; Hon. James Bryce, British Ambassador; Don Enrique C. Creel, Ambassador from Mexico; Baron d'Estournelles de Constant, member of the French Senate and head of the French Section of the International Peace Conference; Col. Sir Robert Cranston, ex-Provost of Edinburgh; Prof. John Bassett Moore of Columbia University, the well-known authority on international law; Hon. William Jennings Bryan, Rev. Lyman Abbott, Archbishop Ireland, Rev. Edward Everett Hale, Chaplain of the United States Senate, and President Charles W. Eliot, of Harvard University.

President Roosevelt sent a letter to the Congress, in which, among other things, he said:

"The United States has a right to speak on behalf of such a cause, and to ask that its course during the half dozen opening years of the century be accepted as a guaranty of the truth of its professions. During these six years we can conscientiously say that without sacrificing our own rights we have yet scrupulously respected the rights of all other peoples. With the great military nations of the world, alike in Europe and in that newest Asia, which is also the oldest, we have preserved a mutually self-respecting and kindly friendship.



MR. JAMES W. VAN CLEAVE, PRESIDENT NATIONAL ASSOCIATION OF MANUFACTURERS.

HON. JOHN BARRETT, DIRECTOR OF THE INTERNATIONAL BUREAU OF AMERICAN REPUBLICS.

"In the Philippine Islands we are training a people in the difficult art of self-government with more success than those best acquainted with the facts had dared to hope. We are doing this because we have acted in a spirit of genuine disinterestedness, of genuine and single minded purpose to benefit the islanders—and, I may add, in a spirit wholly untainted by that silly sentimentality which is often more dangerous to both the subject and the object than downright iniquity. In Panama we are successfully performing what is to be the greatest engineering feat of the ages, and while we are assuming the whole burden of the work, we have explicitly pledged ourselves that the use is to be free for all mankind. In the islands of the Caribbean we have interfered not as conquerors, but solely to avert the need of conquest. The United States Army is at this moment in Cuba, not as an act of war, but to restore Cuba to the position of a self governing republic. With Santo Domingo we have just negotiated a treaty especially designed to prevent the need of any interference either by us or by any foreign nation with the internal affairs of the island, while at the same time securing to honest creditors their debts and to the Government of the islands an assured income and giving to the islanders themselves the chance, if only they will take advantage of it, to achieve the internal peace they so sorely need.

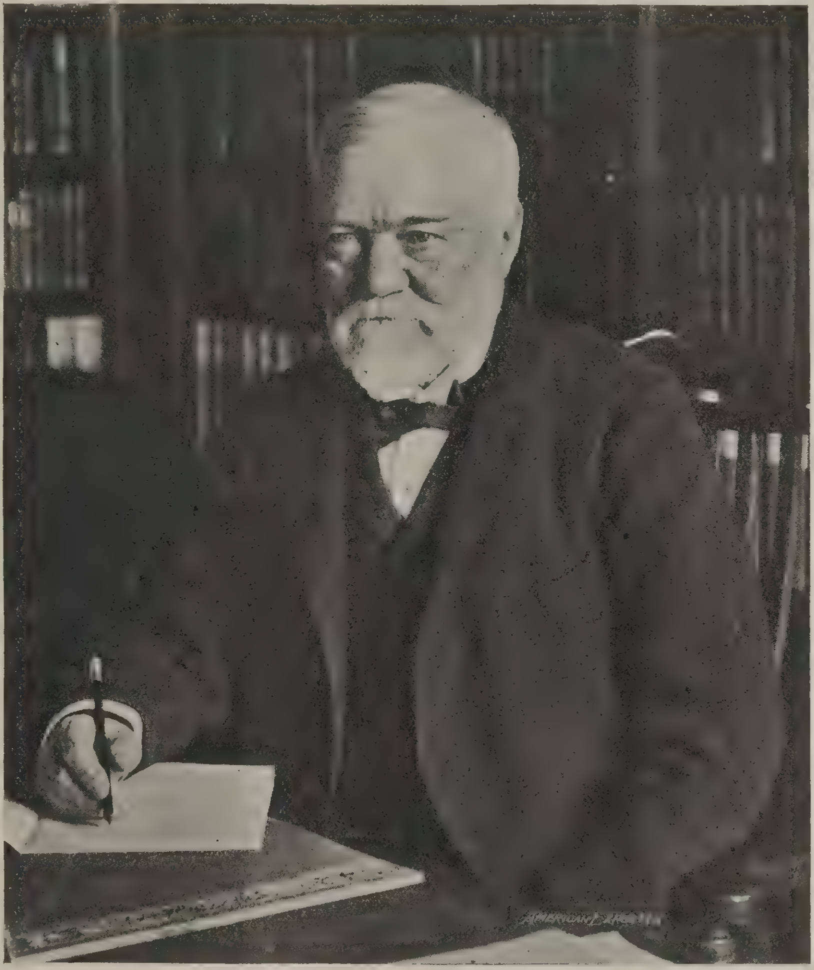
"Mr. Root's trip through South America marked the knitting together in the bonds of self-respecting friendship of all the republics of this continent; it marked a step toward the creation among them of a community of public feeling which will tell for justice and peace throughout the Western Hemisphere. By the joint good offices of Mexico and ourselves we averted one war in Central America and did what we could to avert another, although we failed. We have more than once, while avoiding officious international meddling, shown our readiness to help other nations secure peace among themselves. A difficulty which we had with our friendly neighbor south of us we solved by referring it to arbitration at The Hague. A difficulty which we had with our friendly neighbor to the north of us we solved by the agreements of a joint commission composed of representatives of the two peoples in interest. We try to avoid meddling in affairs that are not our concern and yet to have our views heard where they will avail on behalf of fair dealing and against cruelty and oppression. We have concluded certain arbitration treaties. I only regret that we have not concluded a larger number."

The fifth session of the congress was devoted to the commercial and industrial aspects of the peace movement and offers subject matter for serious consideration to the widely scattered readers of the AMERICAN EXPORTER in the four quarters of the globe. Mr. Marcus M. Marks, president of the National Association of Clothiers, who presided over this session, said in part:

"Merchants have a two-fold interest in encouraging movements tending to substitute a system of law and order for war, in the settlement of differences between nations.

"They share with the professional community the sentimental aversion to the injustice and terrors of war; but in addition to this they have what is sometimes called a selfish interest which prompts them to put additional energy into the task of preserving peaceful commercial relations at home and abroad.

"For commerce (and consequently the welfare of all the people of every country) depends upon the stability of government and the friendly relation between nations, for the uninterrupted and profitable exchange of commodities to the fullest extent. The fact is recognized that only such nations as are in peaceful and friendly contact can thoroughly, sympathetically and satisfactorily study and supply each other's wants, thus developing mutual trading most successfully."



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MR. ANDREW CARNEGIE, PRESIDENT NATIONAL ARBITRATION AND PEACE CONFERENCE.

Hon. Oscar S. Straus, United States Secretary of Commerce and Labor, was one of the speakers at this session and the following extracts from his address are pertinent:

"The wealth and happiness of nations are based upon factors that are international as well as intranational; in other words, they depend not only upon domestic commerce, but also and to an equal degree upon foreign commerce. As an illustration, we have only to take into consideration the fact that within the last forty years the foreign commerce of the United States has grown more than 400 per cent.—from $591,000,000 in 1866 to $2,636,000,000 in 1905.

"I know only one trade that follows the flag of war—the trade of the grave digger. Commerce follows along the lines of least resistance, and is not expanded by the cannon's mouth. As nations have been brought nearer by intercommunication, foreign commerce has increased by leaps and bounds. The idea that as a nation gets weaker and poorer it is the better for its stronger neighbor has been exploded. Modern commerce has shown the absurdity of this conclusion. Commerce is based on absolute mutuality. The welfare of nations is bound together, and each should be interested in the progress and welfare of the other. Has it ever occurred to you that after every war follows a dreadful commercial panic?"

The Secretary said that civilized people had a pretty good idea of what was right and wrong and that nations should follow the same code of ethics used by their citizens. He said he hoped that if nothing else was done at the coming Hague Conference the treaty would be amended so that the lending of money by an individual to a nation at war or about to go to war would be regarded as a hostile act.

One of the soundest, sanest and most businesslike addresses of the whole congress followed. Mr. James W. Van Cleave, president of the National Association of Manufacturers, spoke in part as follows:

"We manufacturers are interested in world peace both as humanitarians and as business men. Stated in terms of money, this interest can be shown to be large. In the aggregate the manufactures of the United States far exceed those of any other two countries. Our production of pig iron in 1906 equaled that of Great Britain, Germany and France together, and these are our nearest competitors. If there be any virtue, therefore, in the multiplication method of appraising things, the interest of the American manufacturers in this vast issue is large. At this hour a capital of $14,000,000,000 is invested in the mills and factories of the United States, and these employ over 3,500,000 persons, who will receive $4,000,000,000 in wages for this year. The finished products of these factories will for 1907 amount to over $16,000,000,000. This stupendous sum, which is too large for us to adequately interpret in comprehensible terms, is as great as the value of the entire property, real and personal, of the United States in 1860, at the time of Lincoln's first election. It is as large as the value of all the property of Spain in these prosperous days of Alfonso XIII. Moreover, much of this vast total depends for its existence on the maintenance of our commerce with the world, for in 1906 we exported over $700,000,000 in manufactures. In our sales of manufactures abroad we rank next to Great Britain and Germany.

"Now, I am not saying that the pocket interest in anything is the largest that civilized man can have. There are moral considerations which make a stronger appeal to us to work for peace than can be expressed in terms of pounds, francs, marks or dollars.

"Many persons think that war promotes commerce, and that thus it aids farmers, manufacturers and all sorts of producers. But this is true only for the moment. The Russo-Japanese war increased America's sales to Japan, Russia and China while the war was going on, but it decreased these sales immediately afterward. To the extent of the drain made upon their resources by the war those countries will have to economize for a few years. Their purchases from the outside world will be smaller.

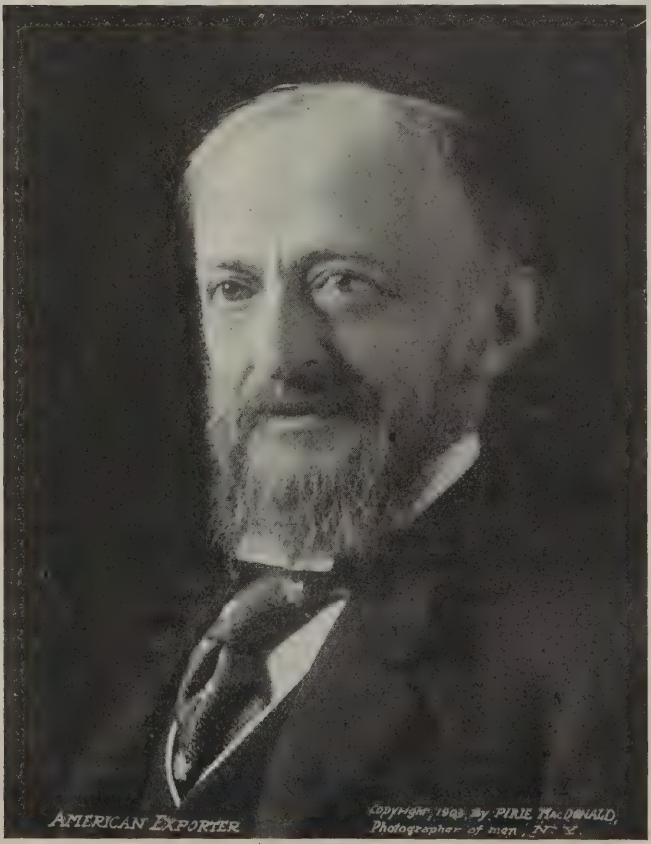
'To an immeasurably greater extent than ever before, the world has become one great family. International commerce has had a very large place in promoting this solidarity. In one degree or another, whatever aids one country benefits all the rest. Disaster, too, is universal in its consequences. Most of us who are here to-day, no matter which side of the Atlantic or which side of the Pacific we hail from, remember the fall of the great London financial and commercial house of Baring Brothers in 1890. The crash was heard around the world. It helped to start the trade dislocation which, in the next few years, striking every country successively, circled the globe.

"International commerce is the greatest promoter of international peace that any of us can name. If Swift was right when he said that the man who made two blades of grass grow where only one grew before deserved better of mankind than did the whole race of politicians, doubly blest must be the man or the nation that puts two lines of steamers on the ocean or builds two lines of railway across international frontiers where only one existed previously. The lines which carry passengers and commodities between Paris and Berlin are doing more to maintain harmony between France and Germany than are all the peace societies of the two countries.

"To a certain extent all international trade is reciprocal. Each country buys from its neighbors as well as sells to them. And the more buying and selling which is transacted between them the better friends they become, and the greater the stake which they have in maintaining peace with each other. For selfish as well as for humanitarian reasons each is interested in the other's welfare. Each figuratively greets the other with the Rip Van Winkle salutation, 'May you live long and prosper.'

Mr. William McCarroll, president of the New York Board of Trade and Transportation, in the course of his address said:

"It is eminently fitting, and it seems something in the nature of compensating justice, that commercial organizations, as such, should unite in and actively support this peace movement. This is not only because peace is a necessary condition for commerce. Peace may exist without commerce, though that would be the peace of stagnation. But general commerce cannot flourish where peace does not prevail. I say 'general' commerce, for it is true, of course, that war produces an unusual


AMERICAN EXPORTER
Copyright, 1903, by PIRIE MacDONALD, Photographer of men, N. Y.

HON. OSCAR S. STRAUS, UNITED STATES SECRETARY OF THE DEPARTMENT OF COMMERCE AND LABOR.

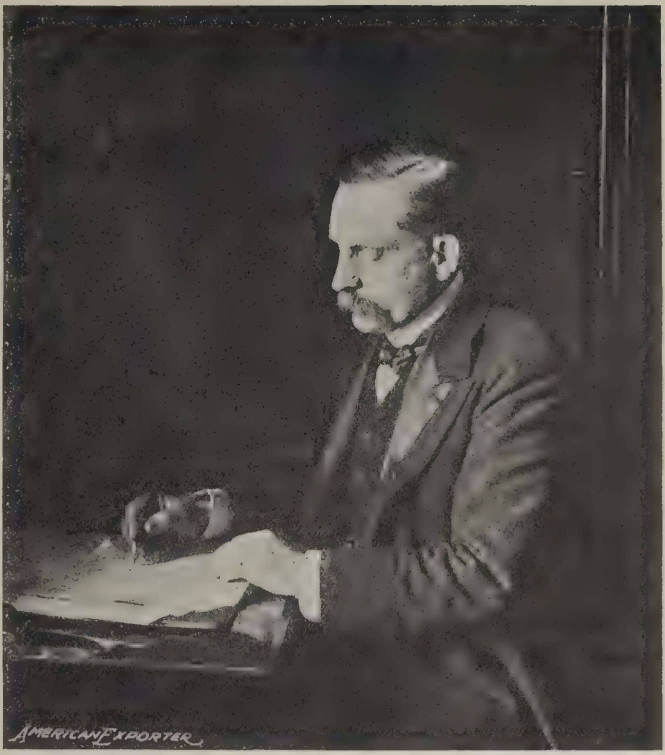
commercial demand for munitions and supplies. The claim has sometimes been made that such is an advantageous result of war, but it is at most limited and temporary and the suggestion is heartless and brutal.

"War robs commercial, industrial and agricultural pursuits of men and means, and the ultimate of it is waste and loss. The result of industrial commerce is growth, permanent gain and prosperity. It may be lamentably true that almost all the great modern modern wars have been chargeable to commercial aggression, or (shall I say?) aggressiveness or greed. Undoubtedly some have been promoted, if not incited, by these. It is not necessary to instance any of these wars, for doubtless they will suggest themselves to you; but this being so, there is, as I have said, a justice in that organizations representing commerce should now unite their efforts in behalf of peace. We hope, as we believe, that such wars would be impossible to-day."

Hon. John Barrett, director of the International Bureau of American Republics, declared in the course of his speech that the work of that bureau is comparable in a way to that of the Hague Conference. Three conferences of the American Republics have thus far been held, and have accomplished far more than is generally supposed in promoting a better understanding and a truer friendship among the republics of the American continents. Mr. Barrett went on to say:

"Since these conferences first began to assemble, the American republics have been getting closer and closer together, and the numbers of revolutions have greatly decreased. Because at the moment there may be a struggle going on among some of the smaller States of Central America, there can be no conclusion drawn adverse to the tranquillity and good relations of the great and powerful republics of Latin America, from Mexico on the north to Brazil, Argentina and Chili on the south.

"If all the Pan-American Conferences had accomplished nothing else than the establishment of the International Bureau of the American Republics, they would have done enough to warrant their being called together. This institution, which is supported by the twenty-one independent nations of the Western Hemisphere, is becoming a powerful international agency, not only for the promotion of commerce and trade, but for the cementing of closer ties of friendship and association. Ever since it was founded sixteen years ago, as a result of the first Pan-American Conference, which assembled in Washington during 1889, and was presided over by James G. Blaine, it has gradually grown in usefulness until now its value and possibilities are acknowledged from the United States to Argentina. The second Pan-American Conference, which assembled in Mexico in 1901-2, enlarged its scope, while the third Conference, which gathered in Rio Janeiro in 1906, laid out a most ambitious plan for the work in the future. The action of the last Conference was so closely followed by the great diplomatic journey of the Secretary of State of the United States, Mr. Elihu Root, and this, in turn, by such an awakening of interest throughout the United States in Latin America and throughout Latin America in the United States, that now the International Bureau is conducting a correspondence and carrying out a policy that must give it a unique position of prominence and power in the opinion of the world.



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BARON D'ESTOURNELLES DE CONSTANT, MEMBER OF FRENCH SENATE. HEAD OF FRENCH SECTION OF INTERNATIONAL PEACE CONFERENCE.

"The United States has never fully appreciated the vast importance and signal success of the visit to South America of its distinguished Secretary of State, Mr. Elihu Root. It is beginning now, after nearly a year has passed, to realize that no other Secretary of State in the history of the United States has accomplished so much for the promotion of international friendship as has Mr. Root in this extraordinary tour. He did more for the removal of distrust of the policies of the Uited States throughout South America and for the upbuilding of mutual confidence and good will than the work of a hundred years of ordinary diplomatic procedure and intercourse."

Mr. Achille Starace, delegate of the Italian Chamber of Commerce of the City of New York, in his address at the conference, said, in part:

"The interest of men engaged in business is to have a continuity of trade, and amicable relations between all nations, as they are the first ones to feel the bad effects of cessation or diminution of commercial intercourse, through an interruption by war."

A peculiarly pleasant incident of the Peace Congress and one illustrative of the good will and friendship existing between the two nations occurred at the banquet on the evening of April 17, when Baron d'Estournelles de Constant, on behalf of the French Government, presented the Cross of the Legion of Honor to Mr. Andrew Carnegie.

AMERICAN ELECTRICAL PRODUCTS IN FOREIGN MARKETS.

BY JOHN BALL OSBORNE.

(Chief Bureau of Trade Relations, Department of State, Washington, D. C.)

This is an electrical age and the United States is *facile princeps* among the countries where electricity has been given the widest application. The average annual expenditure on electricity in this country per capita is at least $7, distributed as follows:

Income of electric traction companies	$3.00
Electric lighting	1.50
Electric apparatus and supplies	1.25
Telephone service	.75
Telegraph, fire alarms, etc.	.50
Total	$7.00

The census statistics of American manufactures show that in 1900 there were 580 establishments in the United States devoting their energies exclusively to the production of electrical goods, having invested an aggregate capital of $83,000,000, and with a total annual output valued at $91,000,000. In addition to these establishments, there were 132 auxiliary concerns whose output brought the grand total valuation up to $105,000,000. It is safe to estimate the present yearly production of electrical goods of all kinds in the United States at about $150,000,000, so great has been the development in this field of American industrial activity in the last few years. The following table indicates the tremendous growth during the period 1880 to 1900, at each census:

	Census of		
	1880	1890	1900
Number of manufacturing establishments	76	189	580
Capital invested	$1,509,759	$18,997,337	$83,130,943
Wage earners	1,271	8,802	40,890
Value of annual output	$2,655,036	$19,114,714	$91,348,889

The electrical industries and applications have thus become, from small beginnings, one of the most important manufacturing interests of the United States. The great advance in electric lighting began in the eighties; in the following decade there was an equally great development in electric railways; while since 1900 there has been a vast exploitation of the electric motor for power transmission, factories, and automobiles. In these fields the supersession of steam and horse power has been constant and ever widening in scope throughout the country, but particularly in New England and the Middle Atlantic States. Electricity has come to be regarded as a sovereign remedy for every industrial deficiency, as well as a cure for almost every human ill. The products cover a wide range; for example, one of the leading supply houses issues a catalogue in which no less than 2,000 separate articles are listed under the designation of electrical supplies.

The following table gives the values of the several classes of electrical products manufactured in this country in 1900, the output aggregating, as already stated, nearly $100,000,000:

		Value of Annual Output.
Dynamos		$10,472,576
Dynamotors, etc.		354,747
Transformers		2,962,871
Switchboards for light and power		1,846,624
Switches		1,129,891
Motors:		
Direct and alternating current	$7,551,480	
Railways	7,568,841	
Automobiles	192,030	
Fans	1,055,369	
Electric elevators	2,523,901	
Miscellaneous	613,883	
		$19,505,504
Batteries:		
Storage	$2,559,601	
Primary	1,119,444	
		$3,679,045
Carbons		1,731,248
Arc lamps		1,827,771
Searchlights		225,635
Incandescent lamps		4,036,112
Decorative miniature lamps, X-ray bulbs, etc.		72,935
Electric light fixtures		2,665,124
Telephones		10,512,412
Phonographs and graphophones		2,246,274
Telegraph instruments		1,642,266
Insulated wire and cable		21,292,001
Electrical conduits		1,066,163
Electric heating apparatus		1,186,878
Annunciators		224,885
Electric clocks		132,149

Lightning arresters, fuses, etc. .	$595,497
Electrical measuring instruments	860,265
All other products	14,634,984
Custom work and repairing	2,063,736

The leading States as regards gross value of output in 1900 were: Pennsylvania, $21,000,000; New York, $18,000,000; Illinois, $12,000,000; Massachusetts, $8,000-000; New Jersey and Ohio, each $7,000,000.

An interesting evidence of the activity in this branch of American manufactures is the large number of patents issued by our Government in the electrical arts. In the period 1870 to 1895 there were 17,530 patents taken out for the principal classes of electrical work, viz.:

Electric lighting	3,622
Telegraphy	3,205
Electrical generation	3,117
Telephony	2,459
Electric railways	2,010
Electric signaling	1,934
Motive power	1,183
Total	17,530

The Patent Office gives me the following statement of total number of patents issued from the beginning of its records (1790) to date (April 15, 1907) for the four leading classes as follows:

Electrical generation	5,660
Electric railways	4,304
Telephony	4,214
Motive power	3,335

Inasmuch as but few inventions in these lines antedate 1870, a comparison of figures in these two tables will demonstrate the great activity of inventors in the electrical arts since 1895.

Not only are the constantly widening demands of the home market kept supplied by the genius of American invention and the energies of American enterprise, but our manufacturers are sending their electrical products into every progressive country in the world, and our export statistics, as well as the trade reports of our consuls, show how well the merits of these goods are appreciated. For instance, the American consul at Belgrade, Servia, recently visited the town of Valjevo, situated in the interior about 100 miles from any railroad, and was gratified to discover there an up-to-date electric plant equipped throughout with American machinery. The owner of the establishment informed him that American electrical goods gave entire satisfaction in that community, being regarded as superior to similar products of German or Austrian manufacture.

According to the statistics of the Department of Commerce and Labor the value of the total exports of American electrical machinery in the year ended June 30, 1906, was $7,869,137, as against $2,052,564 in 1898, or nearly four times as much. In 1900 the exports amounted to $4,340,992, and in 1902 $5,379,746. The value of our exports of electrical appliances, including telegraph and telephone instruments, increased from $4,206,617 in 1903 to $6,931,100 in 1906. The value of the total exports of American electrical goods in 1906 was, therefore, $14,-800,237.

But these official statistics fail to tell the whole story. As Mr. Thomas C. Martin, an able investigator for the Government in the electrical field, has aptly pointed out, the exportation from the United States of these products would be far greater were it not for the fact that the patent rights for their manufacture in Europe have been purchased, or arrangements made for drawings and patterns, as the result of the immediate recognition abroad of their superiority and consequent popularity. American electrical factories have been established in recent years all over Europe—in London, Paris, Berlin, Antwerp, Havre, and other cities—which employ thousands of hands and produce goods that embody American ideas, or capital, or direction, or labor, or all these combined. This situation, of course, greatly restricts importation from the United States; but it is American genius and American enterprise nevertheless.

Our foreign exports of electrical machinery in 1906 were made principally to the following countries:

Canada	$2,131,763	Brazil	$397,570
United Kingdom	1,153,528	Italy	303,909
Mexico	974,248	British Aust'l'sia	293,920
Japan	726,492	France	249,438
Cuba	528,565	British S. Africa	247,401

It seems strange that Germany took only $98,463; this is accounted for by the strength of our German competitors and by the fact that the American factories in Europe did a good business in that country.

The principal countries consuming our exports of electrical appliances in 1906 were as follows:

United Kingdom	$2,030,268	Argentina	$265,359
Canada	890,005	Japan	194,406
Brazil	768,434	Peru	191,309
Mexico	751,706	Germany	188,795
Cuba	500,299		

It may be wondered why Germany is such a small customer under this heading also, actually buying less than Peru or the Argentine Republic. The explanation is that Germany is our principal competitor in the markets of the world and is an extensive manufacturer of similar appliances. The value of her exports of electrotechnical products in 1905 was $17,850,000, and if to those be added apparatus for measuring, registering, and heating and insulating material, the total amounted to $23,800,000. The electrical industries of the empire are remarkably strong and well managed. Beginning with 1903 three powerful groups were formed by the consolidation of the stronger organizations, in order to decrease the number of competing concerns and to control prices, especially in the more important undertakings. Combinations were effected between the Union Electricitäts Gesellschaft of Berlin, the foremost concern on the Continent in electric tramway work, and the Allgemeine Electricitäts Gesellschaft, the strongest organization in the general line of motors and dynamos, arc and incandescent lamps, and apparatus of all kinds;

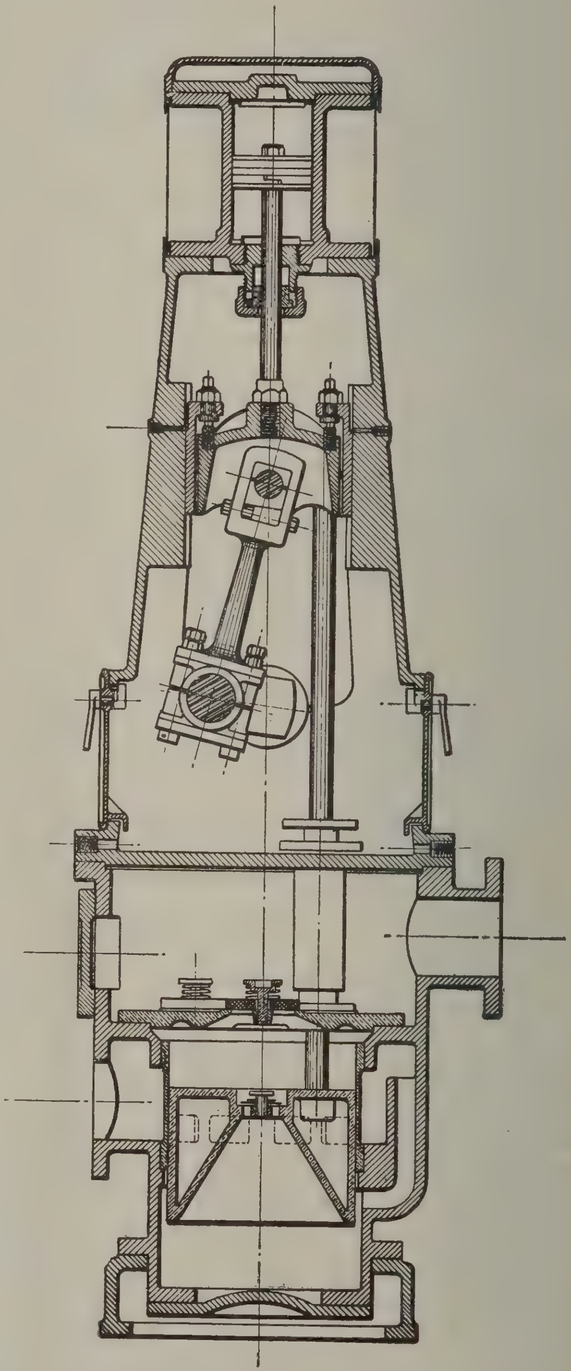
between the Schuckert works of Nuremberg and the Siemens-Halske Company of Berlin, both old and powerful concerns; and between the Felton & Guillaume Company of Cologne, prominent manufacturers of cables, and the Lahmeyer Company of Frankfort.

The earnest attention of American manufacturers of electrical goods who desire to extend their sales in foreign countries is called to the fortified position of the great German concerns, which are their principal competitors in the markets of the world. The same skill and discriminating care that are displayed in the management of these recently combined organizations in Germany are also shown in their systematic quest for new and wider markets in foreign countries for the output of their factories. It behooves American exporters in electrical lines to follow vigilantly and closely the methods pursued by the great German companies above mentioned.

WET VACUUM PUMPS FOR STEAM PLANTS.

One of the most important auxiliaries of the steam power plant is the so-called air pump, upon whose practical efficiency depends in a large measure the success of the plant. The maintenance of a constant high vacuum in the condenser is impossible if the air pump is not capable of good performance under all varying conditions of load. The old style of air pump becomes inadequate under the more exacting requirements of widely varying load. To meet the demands of modern power installations, particularly large reciprocating engine and steam turbine units installed in electric railway power stations, where the load is heavy and variable, the pump shown in the accompanying illustration has been recently perfected. Its sponsor, the C. H. Wheeler Manufacturing Co., of Philadelphia, Pa., calls it the Mullan suction valveless single acting crank and flywheel wet vacuum pump, claiming that it maintains a constant high vacuum in the condenser system by exerting a continuous and non-intermittent suction. The Mullan pump is guaranteed by its manufacturers to operate within two inches of absolute, under full load conditions of steam turbine operation.

In the Mullan pump, as will be seen from the cut, the water and air are dealt with mechanically, and foot and bucket valves are entirely dispensed with. Every lift of the bucket takes its due amount of the water, and increase of speed does not impair the efficiency of the pump. The new pump has a single-acting water-packed bucket with a conical bottom, having a central opening communicating with a small relief valve for taking care of any water which may be carried into the bottom of the cylinder by the grooves in the water-packed bucket. The suction chamber delivers the condensation and its entrained air through openings in the inner shell of the cylinder, above the top of the bucket, instead of at the bottom, as in the usual type of pump; as the bucket rises, the action is that of a "water-hoist," rather than that of pump in the ordinary sense of the word. The absence of foot valves to be lifted on the up stroke, or of bucket valves to be lifted on the down stroke, leaves the communication with the condenser perfectly free and open at all times, preventing the accumulation of back pressure. Moreover, it will be noted that by the construction all of the air is ejected first; and that the clearance space at the top of the stroke is so small that nearly all of the water as well is ejected, thus giving practically no opportunity for air entrained in the water and expanding during the down stroke of the bucket to accumulate in the space at the top of the cylinder.



VALVELESS WET VACUUM PUMP.

So perfect are its workings that it will operate under shop test conditions within one-half inch of the barometer, thus enabling the manufacturers to guarantee a vacuum within two inches of absolute, under full load conditions of steam turbine operation.

GROWTH OF THE TELEPHONE INDUSTRY IN THE UNITED STATES.

BY W. H. TRIMM.

Probably no other industry shows as wonderful development within a short period of time as the telephone business in the United States. When the basic patents covering the theories upon which telephones are operated expired, a little more than ten years ago, the business was a practical monopoly, one company virtually controlling the situation. Upon the expiration of the patents, however, dozens and even hundreds of small companies composed of business men, professional men and others interested in the development of new enterprises, sprang into being, and within five years from the date of the expiration of the patents the country was fairly well covered with telephone lines. The growth has been steadily increasing and during the past ten years an entire change has been wrought in the conditions of the people living in the cities, in the smaller towns and in the farming communities. Ten years ago a telephone, even in the largest city, was considered an expensive luxury which only the rich felt that they could afford. The use of the telephone was almost wholly confined to the business community and largely to the biggest and most wealthy concerns. In the smaller towns and farming communities it was practically unknown.

It has required the strength and energy of many expert and capable men to bring the business to its present stage of development. In the operating field the small business men were the first to demand and secure for themselves reasonably priced telephone service. In the manufacturing field there was a tremendous effort put forth to better the equipment in use and to bring its cost down to a point where a telephone could be used by any business man of ordinary means. Owing to the number of manufacturing companies which started in business upon the expiration of the basic patents, competition was keen and new ideas were soon brought out which bettered the service and reduced not only the initial cost of telephone instruments but the cost of maintaining them. Within a few years it was possible for the smaller business man to have telephone service at a reasonable price, and before long the cost of equipment and the quality of the service rendered made it possible for people residing in small towns and even for farmers to secure telephone service at a price which they could afford to pay.

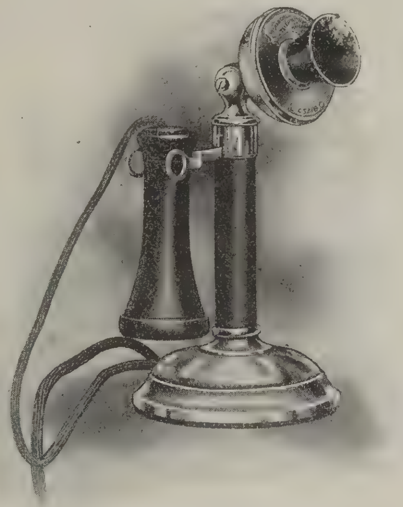


FIG. 2.

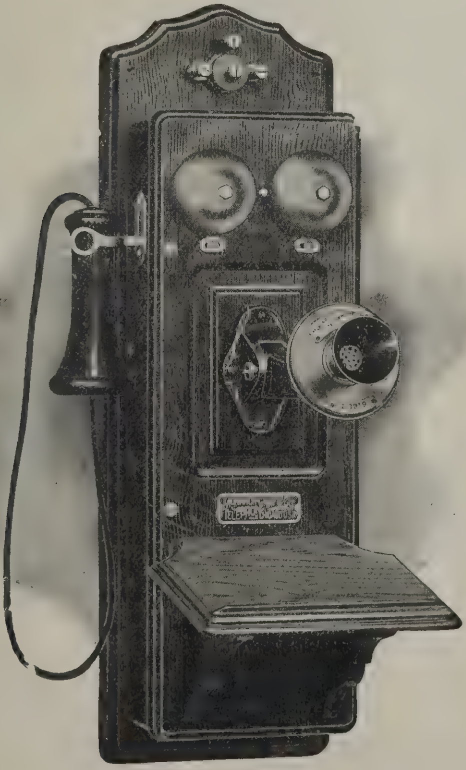


FIG. 1.

To-day there are between five and six million telephones in service in the United States, and these instruments, together with the switchboards, lines, offices, etc., required to render service, represent a total capital investment of more than $6,000,000,000. This investment is divided among more than ten thousand companies, ranging from the small mutual company of the farming districts, with a capital of $1,000 or $1,500, to the large corporation operating in the cities, with a capital of $4,000,000 or $5,000,000.

To-day, in some States, almost every farmhouse is equipped with a telephone, whereas ten or even four or five years ago the farmer with a telephone in his house was a rare exception. In certain localities twenty-four farmers out of every twenty-five have telephone communication with their neighbors and with adjacent towns. The advantages derived from such communication are many. To-day the farmer keeps in touch with the markets of the world by means of his telephone and he is now able to sell his products at a time when the prices are highest, since he is in a position to judge of the general trend of the market fully as well as the man in the city. It is a common practice in a great many of the farming communities for the telephone operator at the central exchange to call up each farmer every morning and give him the prices being offered for his products in the large markets throughout the country. This service is given freely to all subscribers and in many instances farmers have saved thousands of dollars solely from the fact that they have secured the market reports by telephone.

The average price of telephone service in the farming communities in the United States is about $1.25 per month. In some localities $1.50 per month is paid while in others service is given for $1.00, and on mutual lines it is very often furnished for even as low as 50 cents per month. The fact that farmer lines can be constructed by inexperienced men and be maintained with little expense and trouble greatly helps to build up the farming communities. Wherever ten or fifteen farmers want telephone service they can secure it either by connecting to some system already organized or, if no system is available, they can build their own lines, install their own telephones and start the nucleus of a system which may eventually cover the whole undeveloped territory. The history of some of the largest companies shows that the telephone business in the United States has grown out of the demands of the people. Where there was no existing organization to give this service the people got together and gave it to themselves. From little beginnings, such as one or two lines of ten or fifteen stations each, large systems have grown, and now not only do the people enjoy the service desired, but satisfactory returns are given to the investors.

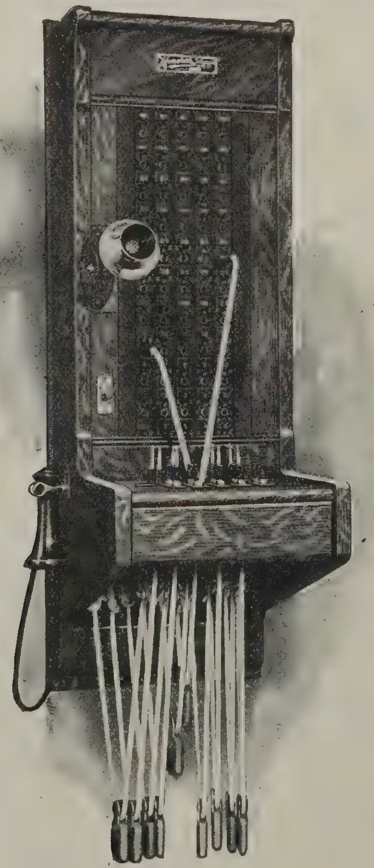


FIG. 3.

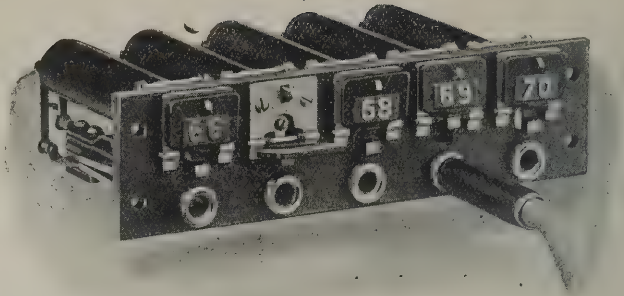


FIG. 4.

A good deal could be written concerning the growth and general development of the telephone business, as viewed by the operating companies and by the people using telephones, but fully as much could be said concerning the growth and development of the industry from the manufacturing standpoint. The tremendous demand for telephones has caused the formation of more than 100 telephone manufacturing companies, all of which have been severely taxed to take care of the ever increasing demand for apparatus. Indeed, a great deal of credit is due the manufacturers of telephone apparatus, as it was they who improved and cheapened telephone equipment to such an extent that telephones could be used in a general way. There are now many manufacturers of telephone apparatus in the United States whose business in the past few years has required the erection of immense and carefully equipped factories. The writer will select for purposes of illustration apparatus manufactured by the company of which he has the honor to be secretary, namely, the Monarch Telephone Manufacturing Company, of Chicago, Ill.

The more usual types of telephones in the United States are somewhat different from those used in other countries, although various styles are made by American manufacturers. In Fig. 1 is shown a wall instrument used for residences and business offices. The cabinet of this set is usually finished in quarter-sawed oak, given a fine finish which brings out the grain of the wood and makes the set worthy of a place in almost any home. The exposed parts are nickel plated or finished in black enamel, and the contrast in color is attractive and pleasing. This instrument is one of the most popular and extensively used styles put out by its manufacturers. One feature of the type illustrated is that the parts are mounted in such a way that they can be removed from the cabinet without difficulty, in case it is necessary to inspect or repair them. Manufacturers have reduced the making of telephones to such a science that an instrument is now so simple that almost anyone with an ordinary knowledge of mechanics can successfully maintain a telephone line or even a telephone system of considerable size.

In Fig. 2 is shown a desk telephone that is extensively used in offices. The convenience of this portable set is apparent. The desk stand as shown in the illustration is a support for the transmitter and the receiver. The transmitter and the base of the stand are nickel plated, while the receiver and the desk stand tube are jet black. This makes a handsome instrument and still a durable one. The other parts of the desk set are mounted in a quarter-sawed oak box which can be placed on a desk or on the wall wherever most convenient.

As already stated, the telephone business in the United States is not confined to any one district, but covers practically the whole country. The cities have their telephone systems, villages have their own systems and the farmers have their small mutual lines. Therefore, manufacturers of telephone apparatus make equipment not only for the largest towns but for the smallest farming communities.

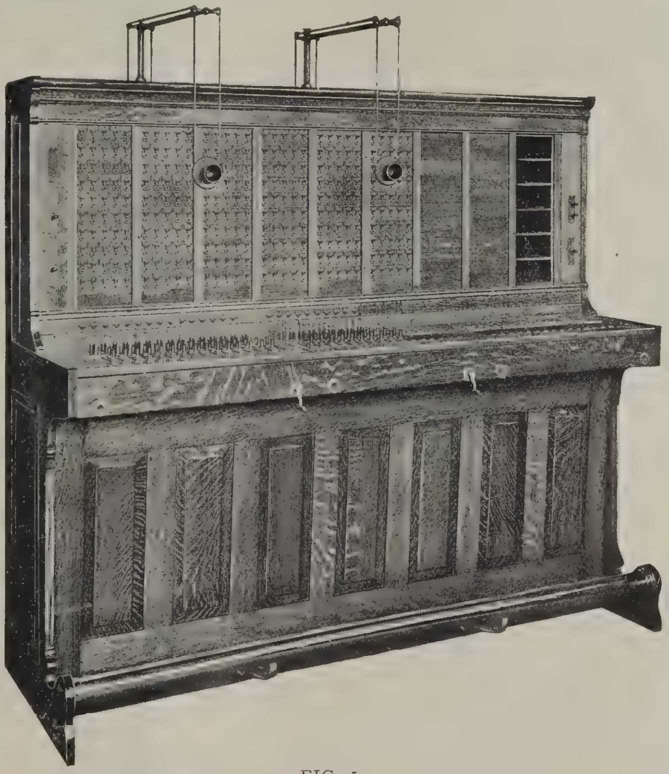


FIG. 5.

The switchboard shown in Fig. 3 is one of those used for connecting a number of farmer lines or country subscribers. The cabinet is finished in quarter-sawed oak and is arranged to be mounted on the wall. It has a capacity of fifty lines, each one of which terminates on the board in a drop and a jack. The service rendered by a little switchboard of this kind is as good in every way as the service given by the largest equipments in the cities. It is a miniature built on the plans of the larger boards.

The drops or line signals are ingeniously designed and yet they are extremely simple in their construction. A strip of five of these drops of the "Monarch" type is shown in Fig. 4. The jacks are mounted immediately beneath the drops and are arranged so that the shutters of the drops are automatically restored when a plug is inserted in a jack. This is accomplished by means of an auxiliary spring placed within the jack, which, when raised by the plug, strikes the shutter and raises it until it is caught by the shutter hook. Line signals of this description are usually known as "combined self-restoring drops and jacks" and this name fully describes them. The fact that the drops are automatically restored enables an operator to answer a greater number of calls, as no time is wasted in restoring fallen shutters. In the old style drops the shutters had to be restored by hand, but in this equipment the shutters are restored automatically as soon as the plugs are inserted.

These drops, though simple in design, are very substantially built. The drop coil is arranged in such a manner that it may be removed from the shell without breaking any of the soldered or permanent connections. The manufacturers claim this as a marked advantage, as coils sometimes become damaged by lightning or other causes and in these drops such trouble can be remedied with very little difficulty. The mounting plate for the drops and jacks is of steel with a dead black finish, while the jack bushings and the drop face plates are nickel plated. The shutters of the drops are black, with number plates having white letters. The white letters show up very plainly against the background and are easily distinguished by the operator.

All of the drops are fitted with night bell contacts, so that if desired a bell can be wired in series with these contacts in such a way that the bell will be operated as long as the shutter is down. Many other valuable points are embodied in this style of drop and jack which space will not permit of my enlarging upon.

A larger board, also of "Monarch" design, is shown in Fig. 5, but it will be noticed that the general style of the equipment installed in this board is the same as that installed in the smaller one. This switchboard has a capacity of 450 lines, although there are but 300 lines installed in this particular cabinet. The blank panels seen at the end of the cabinet can be removed and line signals installed in their place. Another operator's set can also be installed and cord equipments may be placed in the key and plug shelves at the unequipped end. Such a board as this one would be sufficiently large to take care of the business in a town of five or six thousand inhabitants, depending, of course, upon the condition of the people and the number of subscribers which could be secured. In the United States a great many towns have an average of one telephone to every three or four people, but the general average is probably nearer one telephone to every ten people. In some districts, where the telephone business has not been as fully developed, this average is as low as one telephone to every twenty or even forty people.

The switchboards used in large cities are often arranged for from 1,500 to 5,000 subscribers. These large systems are usually of the common battery type, while the smaller plants are of the magneto type. In the common battery systems a subscriber calls "central" by removing his receiver from its hook. This operation lights a small electric lamp in front of one of the operators on the board and is a signal to her that a subscriber is desiring a connection. She then plugs into the jack corresponding to the lamp just lighted and places herself in communication with the calling subscriber. Upon receiving instructions from the subscriber as to the number desired she completes the connection by means of another plug and then rings the bell at the called subscriber's telephone.

In the magneto system a subscriber calls "central" by turning a crank of a generator mounted in his telephone instrument, which action throws a drop in front of an operator on the switchboard. The operator answers the call by means of a plug and upon inserting the plug into the jack the drop is restored and the operator can place herself in communication with the subscriber. The connection is completed and the other subscriber is called in a similar manner to that employed in the central energy exchange.

It will, therefore, be seen that in the central energy systems the subscribers call "central" by removing their receivers from the hooks, while in the magneto systems the subscribers call by ringing with their generator. Another difference between the two systems is that in the common battery systems all current for talking is obtained from storage batteries at the central office, while in the magneto systems the current for talking is obtained from two cells of battery which are placed in each telephone instrument.

Manufacturers in the United States are awake to the fact that telephones are rapidly increasing in numbers all over the world and some of the larger manufacturing concerns have already taken active measures to secure foreign business. The shipments of telephone apparatus from the United States are steadily increasing and the outlook for the future is bright, for the American product compares very favorably with apparatus made in other countries. In fact, it is generally conceded that the telephones and switchboards made in the United States are fully as good if not better than the equipment made elsewhere, and compare favorably in price. Up to this time a large percentage of the telephone apparatus exported from the United States has been sent to South America, but trade from other countries is rapidly increasing.

A unique little pamphlet has just been issued by the Avery Manufacturing Company, Peoria, Ill., under the title of "The Yellow Fellow," a preliminary announcement of the company's 1907 engine and thresher catalogue (now ready for distribution). It is in itself of considerable importance.

SOME NEW ELECTRICAL SPECIALTIES.

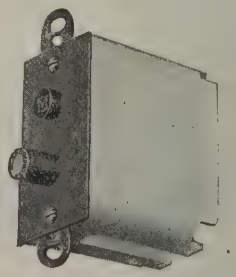
Each of the several devices shown herewith, while small in size and simple in construction, is of no little importance and value in its application to the particular work for which it is designed, and the peculiar merits of each article will be readily apparent from the descriptions given below. All are the products of a large Boston concern which is known throughout the world for the efficiency of its electrical specialties, sockets, switches, cutouts, etc.

NEW AND OLD METHOD OF ADJUSTING LAMP.

The article illustrated in the first cut will undoubtedly interest many of our readers. It is an improved form of the "Dow" adjuster, and is used for raising or lowering an incandescent lamp suspended from a cord. The device works like a curtain fixture, and the cords are rolled entirely out of sight. The adjuster consists of a metal shell or barrel, inside of which is a long coiled flat piano wire spring. To this barrel is fastened an eye, around which the cord is wound, and on the end of the barrel are two pawls which engage the spindle fastened to the shell. When the adjuster is quickly released, it will go up until stopped by the hand. At the same time it can be pulled down to any desired position, at which point it will remain until further adjusted.

The push-button switch shown in illustration is a new design. The novelty consists chiefly in the arrangement of the lug fastening, which adapts this switch to all standard conduit boxes and permits the use of all standard plates without alteration. The chief feature, however, is the fiber false plate which is sent out with all of these switches. This is to protect the switch mechanism from plaster and dirt, which is always a source of switch trouble while a building is being completed and before the permanent plates are attached. This feature has won

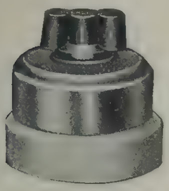
"DOW" LAMP ADJUSTER.

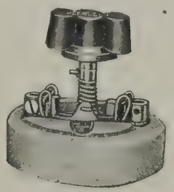


PUSH-BUTTON SWITCH.

for this switch the highest recommendation of architects and engineers.

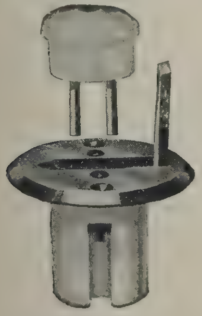
In the midget plug and receptacle put out by this concern, the Marshall Electric Manufacturing Company, of Boston, Mass., some improvements and alterations have recently been made, and it is now furnished with larger holes to take the ordinary screwdriver for fastening the cord wires. The points of the plug contact are also tapered for quick insertion in the receptacles. Where desired, these receptacles are also furnished with an insulating paper sleeve around the receptacle which can be easily rotated to expose the contact wires and screws.

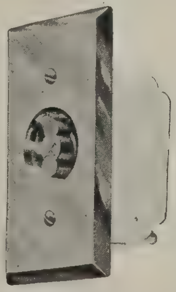

FIVE AMPERE SWITCH.


INTERIOR OF FIVE AMPERE SWITCH.

The new five-ampere switch which this company has recently placed upon the market was designed to meet the demand for such a switch. The accompanying illustrations show the inside and outside of the switch, and from same it will be seen that there are but few parts. The mechanism of the switch is quick-acting, strong and serviceable. Tests have been made which have demonstrated that thousands of turns of the switch might be made without any injury to the mechanism. One feature of the device which is worthy of notice is the lining of the cover. This is drawn in one solid piece without seams or crimping.

In response to a demand from many engineers and architects, the rotary flush switch shown herewith was designed. One of the important features of this switch is the fastening of the face-plate solidly to the back of the switch by screws, doing away with the arrangement of having the plate fastened by the handle, which is said to have a tendency to strain the mechanism and allow the plate to become lopsided after a certain length of time. These face-plates are made from cast metal somewhat thicker than the usual custom.


MIDGET PLUG AND RECEPTACLE.


DOUBLE-POLE ROTARY FLUSH SWITCH.

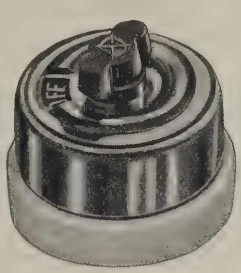
The switches are furnished with handles, the ends of which are exactly even with the face-plate, so that nothing can be hung or fastened to the handles when the switch is in position. When an ordinary type of extending handle is desired this can be furnished for the switch.

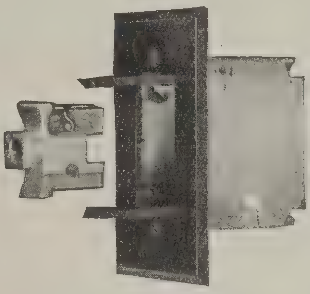
Another feature is the use of a fibre false plate, which is attached to the switch when it is sent out, and which securely seals the mechanism from plaster and dirt between the time of installation and the attachment of the finishing plate.

This concern has also recently designed a new form of indicating surface snap switch for 250 volts, a cut of which is shown here. The dials on these switches are securely locked in position by a plug or projection rigidly fastened to the switch spindle spring plate, which projects through a corresponding hole in the dial, so that there is no possibility of the dial being misplaced and giving the wrong indication.

These switches are also equipped with eccentric binding posts, giving an unusual thickness of metal through which the binding screws are threaded. The cover is lined with hard paper drawn in a smooth, continuous cup without seams or corrugations.

The flush receptacle shown in the last illustration has some new and novel features. The plug is entirely enclosed in the receptacle, so that the finished article, whether with or without the plug, is flush with the plate, the two doors opening out each way, permitting the withdrawal or insertion of the plug.


STANDARD DIAL SWITCH.


FLUSH RECEPTACLE.

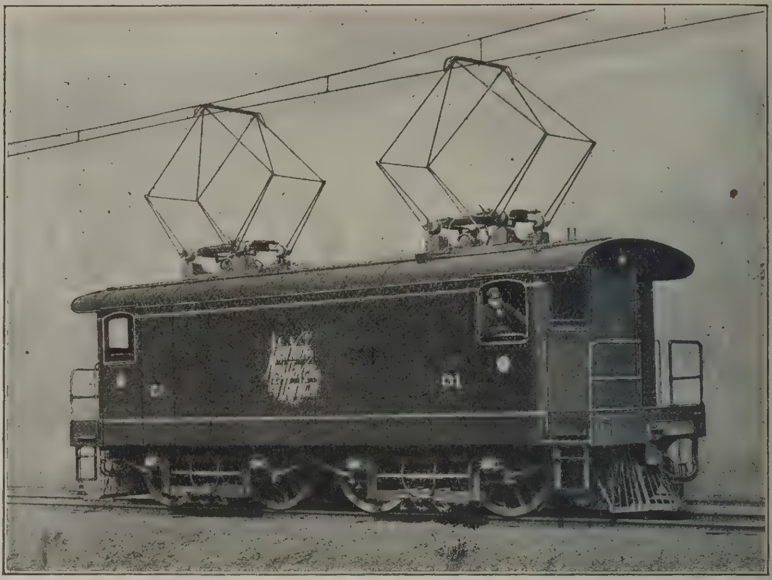
The contacts for wiring the receptacle are easy of access, yet well protected from the metal frames or boxes. The receptacle is arranged with special lugs that adapt it for use in all standard conduit boxes or frames without any alteration or fitting. The receptacle is rated at ten amperes, but carries safely a load of thirty amperes, and the plug will take the reinforced cord.

The postal department of Berlin has just given an order for 200 automobiles, to be used in its service within the suburbs of that city in place of horses. Consul General Richard Guenther, of Frankfort, further notes that in Germany and many other European countries the postal service includes the transportation and delivery of parcels and small freight, which in America is carried on by express companies. Hence the larger number of mail vehicles required by the postal departments of Europe.

During the year 1906 American furniture was exported to the value of $5,162,351, our largest customers having been Mexico, the United Kingdom, the Argentine Republic, Australia, South Africa and Cuba.

ELECTRIC TRACTION DEVELOPMENT.

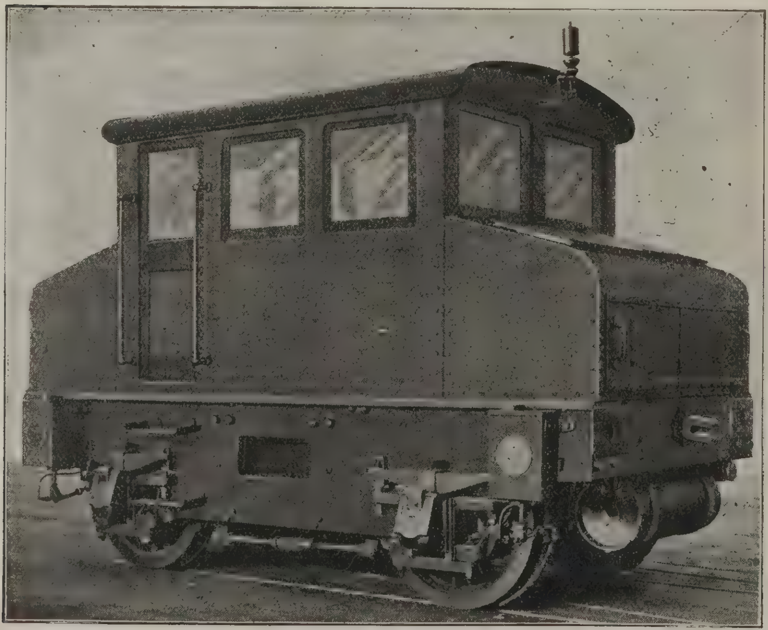
The extraordinary extension of rural electric railways in the Eastern States of the United States has been followed by similar developments in the Central States. For example, an aggregate of no less than 1,200 miles of electric railways is now under construction in the State of Indiana alone. At the capital, Indianapolis, there is a traction terminal station which is entered by twelve main line electric roads, with two new ones to be added before July 1. These railways, running for distances of forty, fifty or one hundred and fifty miles between cities and villages, have almost without exception proved to be financial successes. In addition, they have contributed enormously to the prosperity and the comfort of the farming communities through which they pass. Thus, in the State of Indiana it is estimated that farming properties adjoining traction lines have enhanced in value $10 an acre.



LATEST AMERICAN TYPE OF SINGLE-PHASE ELECTRIC LOCOMOTIVE.

However, while the electric tram lines have thus been spreading themselves in a network over the more thickly populated parts of the United States, progress in the electrification of older steam railroads has also been rapid.

The advent of the single-phase electric locomotive is of comparatively recent date, but has already passed its experimental stage in the United States. Numerous lines using this equipment have been in operation for several years past and have thoroughly demonstrated its superiority in flexibility and economy. One of the most notable examples of demonstrated success is that of the Spokane & Inland R. R., which extends for 130 miles through the States of Washington and Idaho. The first equipment of that road consisted of seven single-phase locomotives, but so pronounced has been their success that an order for eight new electric engines of the same type has been placed with the Westinghouse Electric & Mfg. Co., of Pittsburg, Pa. The same company is supplying the thirty-five single-phase locomotives that are to be used by the New York, New Haven & Hartford R. R. after the electrification of their suburban lines now in progress. The latter locomotives each have four motors of 250 H. P. each and their general appearance is illustrated by the photograph reproduced herewith. The Westinghouse Company has already supplied its single-phase locomotives to some parts of Europe, notably to Sweden, where the first machines of this type were shipped two years ago. The type of locomotive supplied to Sweden differs in some respects from that used by American railways, as will be observed from the accompanying illustration.



SINGLE-PHASE ELECTRIC LOCOMOTIVE, SWEDEN.

The activities of the great Westinghouse interests are world-wide, for in addition to their important European subsidiary or allied companies Westinghouse equipment is in use in every civilized part of the globe. Among scores of other examples, electric tram lines in Manila, in the Philippine Islands and in Dunedin, New Zealand, are operated under the Westinghouse system. Enormous light and power stations in Brazil are equipped with Westinghouse apparatus. The most southern city in the world, Punta Arenas, boasts of a $1,000,000 plant, and Hammerfest, the northernmost city in the world, is similarly equipped with Westinghouse products. The same company shipped the first steam turbine to the Philippine Islands and in the space of six months has received orders for the equipment of no fewer than twenty-six sugar mills and plantation locomotives in the Hawaiian Islands. In an interesting conversation with an official of the company, the facts of the first electric light installation in China were recalled, when $19,000 in gold was sent by the enterprising Celestials of Canton to the Westinghouse offices, in advance payment.

ECONOMY IN SPLICING TELEPHONE CABLES.

Splicing lead encased telephone cable has always been necessary, expensive and troublesome.

It has been expensive, first, because a man who can properly and safely make a horizontal wiped joint is able to command a high price for his knowledge and labor; second, because the equipment, material and time of making this style of joint are expensive; third, when it becomes necessary to hunt for trouble along the line by the process of elimination it is a very costly thing to have to tear open each splice and hunt through the pairs until the trouble is located. Each splice opened must be practically made over.

It is necessary because cables can only be handled conveniently in comparatively short lengths and these must be joined together to continue a line. This makes a straight line joint necessary wherever two lengths of cable are to be joined together. A joint is necessary whenever it is desired to make a branch from the main cable.

A horizontal wiped joint is troublesome because even the most expert cable splicers, with all their knowledge of "heat" and "temper" and "proper plasticity" of solder, can never be absolutely sure that their "wiped joint" is moisture proof and free from "pin holes." The conditions of the weather; the mixture of the metals in the solder and the saturation of the pairs with paraffine at the proper temperature, all go to make a good or bad splice, even with an expert splicer. One may not discover that his work was defective until the next heavy rain storm or fall of sleet, and then it may cost a hundred dollars to find and correct the trouble.

To reduce the expense, eliminate the trouble, and make a line or branch splice a great convenience, instead of a necessary cause for trouble, the Hargis Cable Splicing Joint was invented and patented.

THE APPARATUS.

Fig. 1 illustrates the parts of the apparatus to which reference is made. At the left is seen the lead pot or sleeve; next to it, on top, the lead gasket and brass cup or crown, and under them the rubber washer; following come the spanners, and at the right of the cut is shown the completed joint.

Splicing cable by the use of this joint is claimed to be an operation within the ability of any intelligent mechanic and one in which no cable man can make a mistake. To some extent the operation may be understood from a study of the accompanying illustration. Fig. 2 shows the brass cup or crown wedged in place after the cables have been suitably prepared. Solder is then poured in until the cup formed by the lead gasket in the brass crown is sufficiently filled, and any roughness may be smoothed by means of a blow-torch and wiping cloth as illustrated in Fig. 3. Exposed wires should then be boiled out with paraffine to drive out all moisture from the cable. Fig. 4 demonstrates the ease and effectiveness of this operation with the Hargis splicing joint.

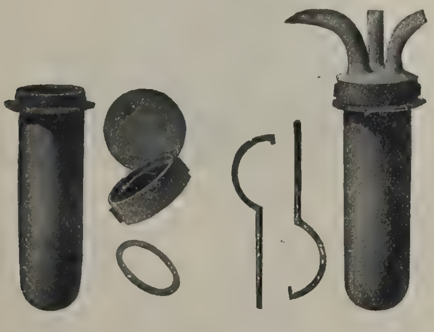


FIG. 1.

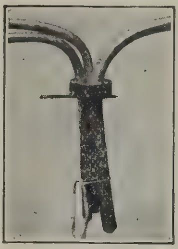


FIG. 2.

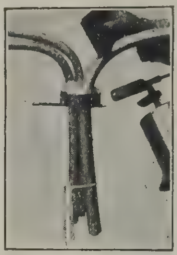


FIG. 3.

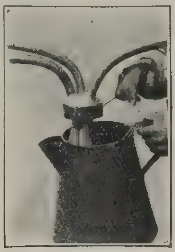


FIG. 4.

The operation of splicing is shown in Fig. 5, in which the manner of holding unconnected pairs out of the way is to be noted. The wires are then laced in the usual manner, see Fig. 6, and should then be paraffined again. The joint is completed by screwing on the bottom of the sleeve as shown in Fig. 7, using the two spanners. This joint is claimed by its manufacturers (W. N. Matthews & Bro., St. Louis, Mo.) to be perfectly water-proof and air-tight; it may be examined at any time, and any one pair can be tested and any multiple changed without trouble or expense.

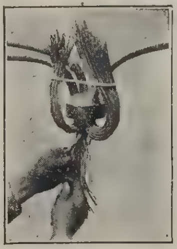


FIG. 5.

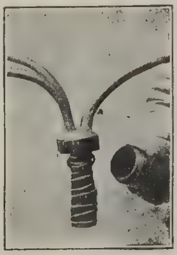


FIG. 6.

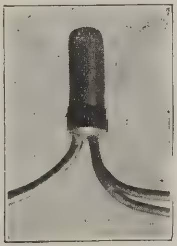


FIG. 7.

A pamphlet recently issued by the American Locomotive Company, New York, illustrates and describes light locomotives, both steam and compressed air, adapted for the use of contractors, mines, logging roads, plantations and industrial plants, and for a wide range of service on light rails and poor roadbed.

The pamphlet contains 31 illustrations of different designs and types, and on the page opposite each illustration is a table giving the principal dimensions of designs of progressive weights and hauling capacities of the type illustrated. The last part of the work is devoted to engineering data and contains a number of very useful tables and formulæ. The pamphlet is a complete record of the production of the company in locomotives of light power.

SOME NEW ELECTRICAL TESTING AND MEASURING INSTRUMENTS.

The illustrations herewith show some of the new and improved types of testing devices now offered by American manufacturers. All have original features which will readily be appreciated by users of such equipment.

PORTABLE MULTIMETER.

The multimeter is a new form of electrical measuring instrument which possesses a very wide range of usefulness. It is claimed that it will more accurately than other so-called "universal" instruments, serve the purposes of a direct-current voltmeter, milli-voltmeter, ammeter, mil-ammeter, ohmmeter, ground detector and Wheatstone bridge. The multimeter consists of a Wheatstone bridge, a battery of twelve silver chloride cells, and an indicating instrument with detachable shunts.

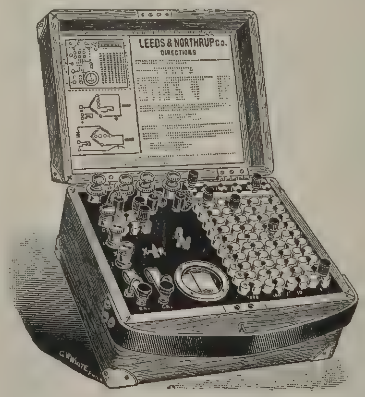
The calibrated scale of the instrument has 160 divisions, with the zero (0) placed at 10 divisions from the end, so that, when the instrument is used as a galvanometer in connection with the bridge, both positive and negative deflections may be observed. The shunts are fastened in a compact form to a single base, and can easily be connected to the instrument by flexible cables; they are constructed of an alloy having a negligible temperature coefficient, so that the combination of instrument and shunt is practically free from errors due to changes in temperature.

The Wheatstone bridge, which forms a part of the multimeter, consists of a rheostat with three groups of coils, adjusted respectively to units, tens and hundreds, aggregating 999 ohms, and a set of five ratio coils. Many novel features are embodied in its construction, and its design is such that compactness and durability are combined with convenience of arrangement and an exceptionally high insulation resistance. The large area of conductors employed, their compact arrangement and the absence of temporary or imperfect connections, together with the perfect fit of the five plugs, reduces the "zero" resistance of the instrument to the minimum. A push button is the only visible part of the double successive contact key, by means of which the galvanometer and battery circuits are made and broken. A separate compartment in the case is provided for the battery, which consists of twelve calls connected together in series and fastened to a hard rubber top. A single cell may be used, or several in series. This multimeter is manufactured by the Weston Electrical Instrument Company of Newark, N. J.

A second illustration represents a type of decade testing set which has recently been placed upon the market by Queen & Co., of Philadelphia, Pa. It possesses some interesting features, not the least of which is its small size, the outside dimensions being nine and one-quarter inches long, seven inches wide and seven and one-half inches deep, with a total weight of eleven pounds. This compact shape is due primarily to a radical departure from the orthodox design of decade testing sets, which consists in arranging the rheostat sections in the form of arcs, while the bridge sections occupy intermediate positions within these arcs. Another new feature is observable in the construction of the contact plugs and switches, the latter making contact with an under surface of each individual contact block, instead of the usual top style.

Each rheostat row carries ten coils of the usual denomination and each ratio arm four coils, while additional blocks are here provided so that one arc can be open-circuited, and in other cases the opposite arm short-circuited, the latter being frequently desirable in such cases as the Murray loop test. The galvanometer is of the D'Arsonval type with a long, narrow coil. A specially arranged shunt allows the galvanometer a much wider range of application than heretofore, shunting values of 0.1 and .01 being provided. Keys are in series with both battery and galvanometer circuits and can be locked down to make permanent contact by means of a thumb nut at the back of the strap. Binding posts and switches are provided so that the set can be used in connection with an outside galvanometer or outside batteries if this is ever desired. The battery consists of six special dry cells mounted in the base of the set. The batteries can be exchanged without unsoldering or re-wiring any connection.

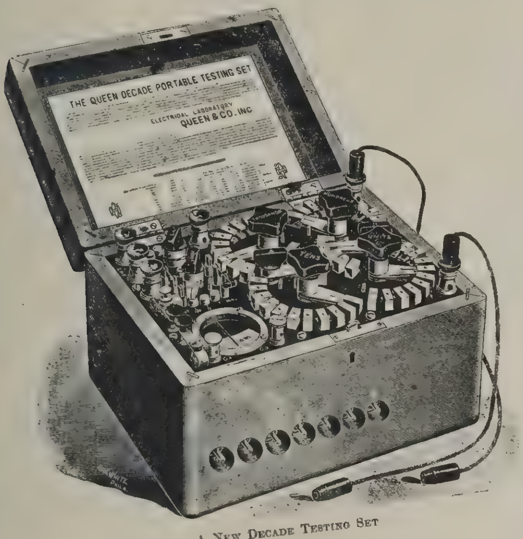
Another type of portable testing set which is meeting with much favor is that put out by the Leeds & Northrup Company, of Philadelphia, Pa. This set also has its resistances in the rheostat and bridge arms arranged on the decade or "plug-in" plan. This method of com-



PORTABLE TESTING SET.

bining resistances has many advantages over the regular post-office or "plug-out" plans, and it is meeting with increasing favor among users of testing instruments.

In addition to the usual advantages of the decade method of connecting resistances, the manufacturers of this set have an improved decade arrangement in which but four coils to the decade are used. The decade plan requires but a single plug for each row of resistances, which makes it very convenient to manipulate, and has the advantage that the resistance is read directly from the position of the plugs. As will be noted from the illustration, the blocks are in pairs and each pair is mechanically independent of the other blocks. There is therefore no danger that a plug contact will be loosened by removing a plug near it. On account of the ample distance between the rows there is no trouble in manipulating the plugs even when the operator's hands are benumbed by cold or he is obliged to wear gloves.



SMALL DECADE TESTING SET.

The bridge arms are so arranged that any one of the coils, 1, 10, 100, 1,000 or 10,000, may be connected in either bridge arm, a matter of great importance, as obviating the necessity of committing to memory particular settings of the plugs. The bridge can consequently be reversed and the coils interchanged very simply. This set is arranged for the location of faults, crosses and grounds by the Murray and Varley loop methods. The changes from a resistance measurement to fault location are quickly made by the transference of two plugs.

The galvanometer is of the D'Arsonval type, and is designed to withstand the rough usage to which apparatus of this class is at times subjected. Binding posts are also provided, so that an external galvanometer or battery may be used in the location of very high resistance faults, but for all ordinary cases the contained galvanometer is amply sensitive and the battery in the set has sufficient E. M. F.

LINEMAN'S TESTING TELEPHONE.

The all metal combination telephone just placed on the market by the Stromberg-Carlson Telephone Mfg. Co. (Rochester, N. Y.) will be recognized by discriminating exchange managers as the epitome of the lineman's testing telephone. Until now most linemen have been compelled to use one of the familiar forms of rubber encased microphones covered with insulating tape and arranged in various ways to make a satisfactory instrument for outdoor use.

The construction of this central energy combination telephone is simple, neat and strong.

The frame or handle is made of seamless brass tubing, drawn especially for this design and is so strong that it is impossible to bend or dent it. The regular solid back transmitter electrodes are enclosed in a case mounted directly on a frame. The perforated cast brass mouthpiece and clamping ring hold the diaphragm spring in place.

The receiver is the regular operator's type in a specially designed case, having all exterior sides and edges of metal to prevent breaking the ear cap, which is enclosed as much as is practicable.

A cut-out button is arranged just opposite the receiver for cutting out the transmitter, thereby preventing the annoyance of side tones taken up by the transmitter when listening in on the line in a noisy place.

The construction is rigid and free from any sharp edges or corners. Both the transmitter and receiver are accessible by unscrewing the clamping rings.

All parts are thoroughly insulated and heavily nickel plated, and a green silk braided tinsel two-conductor cord, equipped with snap clips, is furnished to enable immediate and sure connections.

The complete instrument is not more than eight inches in length and may be carried in the pocket.

About one hundred of these test sets are already in use for "central energy" service, and in a variety of tests are said to have proved most satisfactory as a lineman's test set under the best and worst conditions.

Catalogue No. 14, recently issued by Armstrong Brothers Tool Company, of Chicago, Ill., fully describes and illustrates the various lathe and planer tools and other machine shop specialties for which this concern has become so well known. Several new specialties which have recently been added to the company's line are also shown. The catalogue is gotten up attractively and in a convenient form for handling.

The John F. Allen Company, 370-372 Gerard Avenue, New York City, known as the sole builder of the "Allen" portable pneumatic riveting machines, has just filled an order for four more of its riveters for the American Car & Foundry Company. Two of these machines are for the company's plant at Jeffersonville, Ind., and two for its works at St. Charles, Mo. This well known car and foundry company now has in use at its various plants 125 of the Allen riveters, which in itself is a high tribute to the excellence of the machines.

INDUSTRIAL APPLICATIONS OF ELECTRICITY.

In the United States the motor driven tool has supplanted the steam engine to a far greater extent than in European factories and shops. Yet motors are fast winning their way in England and on the Continent and many of them are the product of American manufacturers. Apart from the unrivaled convenience of the individual or direct-connected motor, such forceful, economic considerations as the substitution of the flexible wire for long, cumbersome, expensive and uncleanly lines of shafting and belting, and the enormous economy in power effected by the ability to shut down one machine and absolutely stop its consumption of power, without stopping a whole shaft, carrying, perhaps, a score of other machines, are not to be denied. Practically every American manufacturer of machinery, is to-day cataloguing motor-driven equipment alongside of older designs, while separate motors are offered by numerous companies whose products and prices compare more than favorably with any in the world. Indeed, as the use of the motor is more widespread and general in the United States than elsewhere, it is only to be expected that its development in this country will be far in advance of the world, and it is by no means surprising that at least two American companies stand at the head of the electrical manufacturing interests of the world and are as generally and as favorably known in Europe as in the United States. But innumerable competing American manufacturers offer types of their own, with features and advantages deserving careful investigation by buyers in other parts of the world.

Not only are the heaviest machine tools and woodworking or other machinery driven in modern shops by electric motors, but the range of the motor has now been extended to almost every form of machine or apparatus that requires power of any sort.

Exposition of Motor Driven Machines.

Visitors to the Electrical Trades Exposition held in Chicago this past winter, who went expecting to see the same things they saw last year, were agreeably disappointed. Indeed, all except those who have been closely watching the progress of electricity were surprised at the great variety of new devices and appliances that were on exhibition.

One of the most marked advances has been in motor application. The electric motor is not only successfully replacing every other form of power drive, but is fast abolishing manual drive for even the smallest machines. There is scarcely any type of machine that cannot be driven more economically, conveniently and efficiently by the modern small power motor (now made in units as small as 1-25 horse power) than by hand.

In one exhibit alone, that of the Westinghouse Electric & Manufacturing Co., of Pittsburg, Pa., there were to be seen twenty odd machines of widely varying types, driven by motors exactly suited to their requirements. There was scarcely a visitor to the show who did not find some type of machine in which he was directly interested, and went away with new ideas of economy and convenience. There were machines not only for manufacturers in various lines of business, but also for domestic purposes. It is only lately that electricity has meant anything more than light in the home. That this is only one of its many uses was demonstrated by the motor driven household utensils that were in operation in this exhibit, which included a washing machine, an ironing machine, a sewing machine, and a sanitary cleaning and scrubbing outfit. The latter device attracted much attention through its ability to remove quantities of dust and dirt from apparently dustless clothes, rugs, upholstery, etc. The use of a plant of this nature for private residences depends upon the motor drive, as any other form of power would be too expensive and require too much space and attention.

It goes without saying that a form of power which is economical enough for domestic purposes is well adapted to the requirements of those who cater to the domestic needs upon a large scale, and so hotel keepers, grocers, laundrymen, bakers and confectioners found many of their devices of daily use among the motor driven machines, such as coffee grinders, dough mixers, ironing mangles, refrigerating machines, clothes washers, dish washers and ice cream freezers. That electric motors furnish ideal power for all such machines was apparent to all who saw them in operation.

Among the machines of interest to manufacturers were a lathe, a saw sharpener, a ventilating fan, a printing press, a drill and a blacksmith blower. Merchants found an interesting device in the motor driven automatic pin ticketing machine, which is fast replacing the old method of price marking goods by hand.

American Motors for Japan.

Representatives of the Oji Paper Company of Tokio, Japan, have for some time been inspecting various electrical properties in the United States, with the object in view of installing a modern electrically equipped paper mill in Japan. As a result of their investigations, orders have been placed in the United States for a very complete electrical and mechanical equipment amounting to over one million dollars.

The new Japanese paper mills, which will be operated by the electric drive, will include, in addition to the motor equipment of the paper making machinery, a new hydro-electric plant, with a fifteen mile transmission line and sub-station. The electrical equipment will be furnished by the General Electric Company of New York.

At the power station there will be installed four water wheel driven three-phase, 3,125 KVA units, generating current at a potential of 3,450 volts, at a frequency of 60 cycles. Current for exciting the revolving fields of these generators will be furnished by the usual twin exciting units, consisting of two 150 kilowatt generators, driven respectively by an induction motor and a small water wheel.

Twelve water-cooled, step-up transformers will be arranged in sets of three to raise the generator voltage for transmission. Each transformer will have a capacity of 1,050 kilowatts, and the primary voltages will be arranged with Y connections for either 46,000, 45,000 or 44,000 volts. An eight-panel switchboard will be installed in the main station.

At the sub-station near the mill, twelve step-down transformers will be employed to reduce the transmitting potential to 2,200 or 2,100 volts. The switchboard will be arranged to distribute power at the desired voltage directly to the motors.

In the paper mill five 750 horsepower, 2,000 volt induction motors will be used to drive the pulp grinders. These motors are known as Form M, having an external resistance in the armature circuit and controllers to vary the speed. Each motor will have an extended shaft and will be so placed between two pulp grinders that both grinders can be driven directly without belting. Four beater machines are to be driven, each by a 350 horsepower induction motor operating at a potential of 2,000 volts. A fifth will be driven by a 200 H. P. induction motor and all will be operated on the rope drive system.

The Oji paper mill will be situated at Hokkaido on the seashore facing the Pacific. It will be an excellent example of modern engineering practice, of which there are coming to be so many typical installations in Japan.

Electric Power Plant for Mexico.

Important additions are to be made to the existing plant at Pachuca, Mexico, where approximately 3,000 H. P. has been in operation for the past six years, supplying both power and light. A further 5,000 H. P. is required by neighboring mines and a contract has recently been signed with the Westinghouse Electric & Manufacturing Company, of Pittsburg, Pa., for a complete equipment of a new plant which it is intended shall be as modern as any plant in operation in Mexico or elsewhere, and a quantity of new apparatus has been ordered for the existing plant.

At the old station there is in operation, approximately, 3,000 H. P., comprising six 375 K. W. Westinghouse generators. The generators supply the energy at 440 volts, which voltage is raised to approximately 25,000 volts, 3-phase, by means of various banks of large transformers. At the Pachuca end of the transmission line this voltage is reduced to 2,200 volts for general distribution to the various customers.

The new plant will be equipped with four 1,540 K. W. generators, generating current at 2,200 volts. There will be two 125 K. W. exciter generators for exciting the fields of the alternators. The switchboard arrangement, together with the lightning protective apparatus and controlling switches, will be of the latest and most improved design; the main switchboard will comprise 9 panels, and the controlling switches will be of the latest oil controlled type, operated from the main switchboard by electric contrivances.

The voltage of the generators is raised approximately 25,000 volts, by means of 540 K. W. transformers, and the energy is transmitted at three-phase to the Juando plant, where it is connected in multiple with the Juando circuits to Pachuca. A double pole line obviates the possibility of a shutdown, which might occur on either of the circuits.

At the Juando station additional switchboard equipment is being provided for accomplishing the multiple connecting of the two generating stations, and in Pachuca a second receiving station has been built, in which will be installed an eleven-panel switchboard with all the necessary distributing circuits to the various customers.

Traveling cranes have also been provided in the new station, a ten ton crane over the transformers and one of twenty tons over the generators. The necessary number of transformers has been provided at this second Pachuca distributing station to handle the additional energy supplied by the new plant. All the necessary switching apparatus and ten 375 K. W. Westinghouse transformers will be installed in the receiving sub-station for the mining people at Loreto and Dificultad. There will be 20,000 volts primary, stepping down to approximately 6,000 volts.

The line to Pachuca is about 50 kilometers distant from Juando, and another line 25 kilometers in length was extended some time ago to Dublan, on the Central Railway, where a sub-station is located with complete equipment for supplying some 500 H. P. used in cement works at that place. This latter company has found electricity to be so far superior to steam in economy and convenience that arrangements are being made to double its present capacity.

The annual Poultryman's Guide, or Silver Jubilee Catalogue, which the Reliable Incubator and Brooder Company, of Quincy, Ill., is putting out this year is the most complete and interesting work of the kind which this concern has yet issued. Its value to poultry dealers can scarcely be overestimated, as much of its contents is devoted to practical poultry questions, every phase of poultry raising being considered. Some of the subjects treated in detail are: The growth of the chicken in the egg; how to get fertile eggs; the proper food for fowls, etc.

In a neat little booklet just issued by the United Manufacturing Company, of Detroit, Mich., under the title of "Ignition, Vaporization, Installation and Operation of a Gasoline Motor," the subject of practical operation is dealt with instructively and in detail, and the book contains much information of practical use and value to all users of gasoline motors.

"Mogul Type Freight Locomotives," a pamphlet recently issued by the American Locomotive Company, of New York, is the seventh of the series which is being published by this company describing the various standard types of locomotives. This phamphlet illustrates and describes twenty-five different designs of the "Mogul" type built for various railroads. The designs illustrated range in weight from 49,000 to 187,000 pounds, with hauling capacities adapted to a variety of road and service conditions.

AMERICAN MINING MACHINERY AND APPLIANCES.

Japanese coal miners about the little town of Moji carry safety lamps branded with American trade-marks. Fiercely bearded Russians smelt copper ores in apparatus constructed in American factories. Miners in Australia, in the Transvaal, up in the Andes—in every part of the world where mining flourishes—use American machinery and appliances. American dredges are employed in the frigid Yukon, American prospecting drills are in demand in the Soudan, to be used in a mid-day temperature of 120 degrees when any shade is available. French and German refiners of copper are to-day asking quotations for smelting plants in the United States, because they are convinced that they can here obtain apparatus that will produce desirable annual economies in operation.

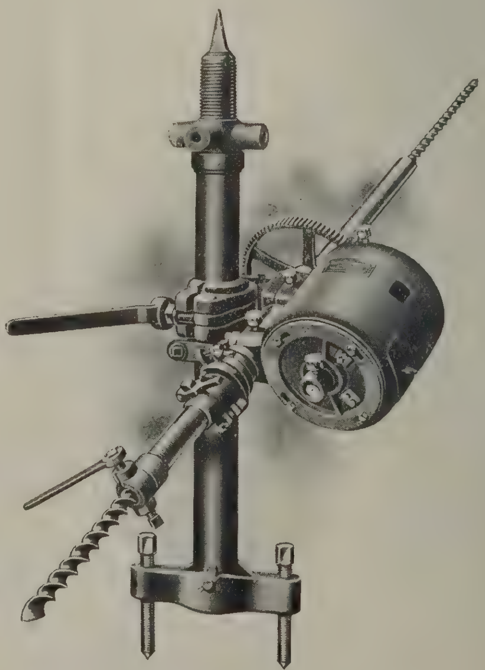
In the older mining territories throughout the world American mining machinery is well known and its improvements meet with appreciation and welcome abroad. A prominent banker and capitalist of Paris, heavily interested in the development of African mineral resources, in an interview two weeks ago, said: "The Americans have a vast territorial expanse for studying economic geological questions not possessed by the people of any of the European countries. To some extent this is an explanation of American pre-eminence in the field of mining machinery; the rest is due largely to the native genius and versatility in meeting conditions as they arise."

Apart from the present satisfactory position of American machinery in the mining districts that are better developed, there are numerous opportunities for the sale of American appliances in connection with mining enterprises that are now being opened up in different foreign countries. In fact the development of mining possibilities throughout the world was never more promising than at the present time.

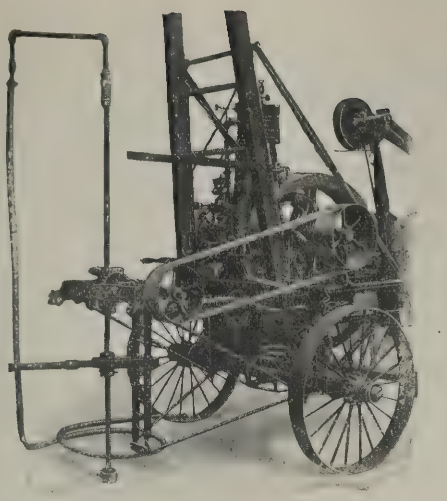
The *Australian Mining Standard* calls attention to projects for the erection of two additional furnaces and a smelting plant to meet the requirements of the rapidly developing antimony mines in New South Wales. And a Sydney correspondent of a London financial paper writes, under date of February 19, that the great requirement of the mining districts of the Commonwealth is an increase of facilities for smelting ores. The *Iron and Coal Trades Review,* of London, commenting on the tin industry of the Malay States, observes: "The lode formations are practically unknown. Other areas of alluvial deposits are only waiting the arrival of the intelligent prospector. A certain development has already taken place, especially in the State of Perak, where machinery is being used to some advantage, but probably greater developments will follow, and the main object will be the elimination of the coolie. That the cubic yard can be shifted by coolie labor at a very low figure is granted, but properly designed machinery with practical men in charge will be the means in the near future, and will treat the cubic yard at a very much lower figure than at present."

South African Mines, in discussing the possibilities of Madagascar, points out the fact that large profits have been made for several years past in buying gold from the natives who work the rich alluvium how and as they deem best, and that there are rich possibilities in the introduction of machinery and in the exploration of the west and south of the island, where gold, copper and tin are known to exist. A writer in the *Engineering and Mining Journal,* reviewing the progress of South American mines in 1906, says: "It is interesting to note the statistics of the total gold productions of some of the countries of South America. Columbia is credited with $895,000,000; Brazil, $720,000,000; Bolivia, $199,000,000; Peru, $119,000,000; and Chile with $33,000,000. This makes a grand total of nearly $2,000,000,000, about one-fifth of the total world's production. The figures are significant and suggest possibilities for further development and lucrative exploitation with modern economic methods."

In another issue of the same journal a mining engineer describes his carriage drive of 1,500 miles across the Kirghiz Steppes of Southern Siberia to inspect lead, copper and coal properties. And again, a third engineer reports on the development of the gold mines in the Gold Coast Colony of West Africa, where one mine is now adding to its former 10-stamp mill a new 50-stamp mill, others have 30-stamp mills and cyanide plants and yet another is crushing about 5,000 tons a month with a dry-crushing plant. Manchuria now offers an exceptionally attractive field to the miner and to the machinery



ROTARY ELECTRIC DRILL.



COMBINATION DRILL, SHOWING CORE ATTACHMENT.

manufacturer and will undoubtedly develop into a large customer for American mining appliances in the course of a few years.

The active participation of American capital as well as engineering talent in the development of hitherto unknown mineral resources is illustrated in the expedition now *en route* to the Congo State, where a joint company of American and Belgian engineers is due to arrive in June. A special steamer has been procured for their use, and it is understood that development work is to begin immediately and that a new town is to be laid off somewhere near Stanley Pool.

American manufacturers of mining machinery have, therefore, exceedingly bright prospects before them for a growing export business. What the actual volume of such business has been in the past it is difficult to determine. The official statistics of the United States Government in this regard are both incomplete and misleading. Incomplete, because it was not until July, 1906, that our exports of mining machinery were differentiated from that familiar and exasperating "all other"—the statistician's scrap heap. Misleading, because undoubtedly a certain part of our exports classified as electrical machinery is actually intended for mining use, and because hoisting engines and other forms of machinery largely utilized by mines are not separately listed, but are dumped into that same "scrap heap" from which mining machinery, so called, has so lately been rescued. However in the eight months that had elapsed at the publication of the last official figures, since mining machinery had reached the dignity of a special classification, our exports in this line are stated to have been $3,723,550.

Recent practice in the United States is all in the line of the application of electricity to every possible branch of mining. Mountain streams even though forty or fifty miles distant are made to generate electric currents which are led by the flexible wire to the points where they are to be utilized and applied, no matter if a mile underneath the surface of the earth. Other parts of the world manifest a growing disposition to follow the American example in this respect, and since motor driven machinery is preëminently an American specialty it follows that the immediate future for our foreign trade in mining machinery is exceptionally bright. During the past year notable improvements have been made in many of the older machines and some new inventions have appeared on the market which are worthy of description.

ELECTRIC DRILLS.

A new electric drill has recently been introduced by the Howells Mining Drill Company, of Plymouth, Pa., which its manufacturers claim possesses features that make it distinctly different from others. While making almost fifty different styles of hand and compressed air machines, these manufacturers are now devoting their chief effort to the electrical drill which we illustrate and which is known as the "Spry." This is a high speed drill of the rotary auger type, operated by 220-250 volts, either direct or alternating current.

In designing the machine, it was the object of the manufacturers to produce a rotary electric drill which would be more powerful than any previously in use. Its efficiency is demonstrated by the fact that it is capable of drilling rock, coal, rock-salt, fire-clay, slate, plaster rock, gypsum, shale, etc., in fact anything that an auger will penetrate, drilling coal at the rate of 9 feet per minute, and slate and medium rocks at the rate of 5 feet per minute.

The dimensions of the motor are small and everything has been made as light as possible, but at the same time much care has been taken to make everything strong, in order to withstand the rough usage that is experienced in mining operations. Several types are made, suitable for any voltage.

PROSPECTING DRILLS.

Within the past year a complete combination drill has been placed on the market handling core, hollow rod and cable tools, or any two of the systems. This machine has been perfected to meet conditions which cannot well be met with one tool equipment, or in territories where the character of the formation is not known. The drilling elements employed are in no way an experiment or new, but the design and construction of the machine, making it possible to operate any of the ssytems successfully, is novel and appeals very strongly to the experienced prospector. The cost of the drill work can be reduced in many instances; it may be desired to obtain cores of strata at considerable depth and simply a record of the depth, thickness and character of the overlying strata; the drilling can be started with the churn drill, which brings the material out in cuttings, and continued down to a point where it is desired to obtain cores; the core attachment is then put to work and cores removed, getting the same practical result as by using a core drill from top to bottom, yet at a great reduction in cost below that of core drilling had the core drill been used from top to bottom. Also in territories where bed rock lies at great depth and a great amount of soft material must be passed through, or the material is badly broken, as is the case in many places, there are no tools that will work so successfully in this kind of material as churn drills of the hollow rod or cable type. A purely core drill is not so well equipped for driving and pulling long strings of drive pipe as is the churn drill; neither will it drill so rapidly in soft formations, such as soft shale or the other similar material. Holes can be sunk rapidly with these equipments and much time saved. The outfits are built in a number of sizes and styles and various equipments to meet conditions that prevail in any locality. They are built by the Cyclone Drill Company, Orrville, Ohio, in connection with their standard well drilling and prospecting outfits.

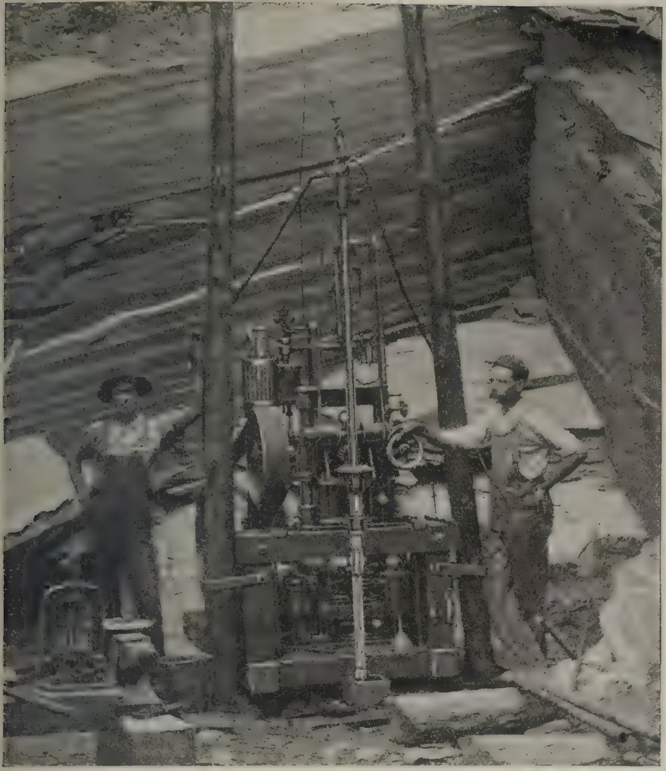
A Diamondless Core Drill.

The determination of the order, character and thickness of the strata of the earth's crust by the removal of a core from a bore hole is a most important feature of mining work. Whether coal or metal is sought, the depth and value of the deposit should be known in advance as a basis of operation. In constructive engineering the determination of underlying strata is essential in preparing safe foundations for works of magnitude. The first great advance over the old fashioned drills used for this purpose was marked by the advent of the diamond drill. This was the invention of Leschot, who was the first to apply the diamond to the end of a rotating tube for boring purposes. The cut made by this tube was annular in form and, in theory, a solid core was left inside the cutter, which could be broken off and drawn up at intervals, thus giving a reliable record of the various layers passed through. But when Leschot began his investigations, large black diamonds of good quality could be had at a price of $3 per carat, while at the present time the price has advanced to about $85 or $90 per carat. As the cost of diamonds increased and as the greater depths reached and other circumstances created a demand for larger cores, engineers began to seek other means of making an annular cut to all depths and removing a core record. Various substances were tried as substitutes for the diamond, but always without success. But the experiments, diligently prosecuted, led to the discovery almost simultaneously of the Davis steel cutter and the method of shot drilling. The Davis cutter proved to be the greatest coring tool ever used in soft, medium or moderately hard materials, but it would not cut through the hardest rocks. The shot bit, on the other hand, showed remarkable penetrating qualities in very hard rocks but was practically useless in soft materials. These two methods, therefore, seemed to be complementary to one another and it became evident that the solution of the core drilling problem lay in their successful combination. The Ingersoll-Rand Company (New York), who favor us with the foregoing information, go on to say that their Davis calyx diamondless drill, which resulted from their investigations along the lines just indicated, is the only device thus far successful for core drilling without diamonds. The teeth of the Davis cutter are forged from solid steel of a special composition, and make rapid progress in shales, slates, clays, or ordinary sandstones, sometimes penetrating at the rate of three-quarters of an inch per revolution. Its operation is practically a reproduction of the stone mason's manipulation of hammer and chisel, the teeth of the Davis cutter representing the chisel, which is actuated by the twisting of the drill rods as they are rotated and forced downward. Simultaneously a continuous stream of water is pumped down through the hollow drill rods and returns to the surface through the restricted space surrounding the core, carrying with it all the cuttings washed away from before the cutter. As the bit rotates and penetrates deeper and deeper, a solid core of the rock cut rises upward through the cutter into the core barrel. This core is at proper intervals broken off and raised to the surface.

But when rocks are encountered so hard that the Davis cutter will not penetrate them at a payable speed, the cutter is removed and replaced by a shot bit. Chilled shot is produced by atomizing molten iron or steel and then suddenly chilling these particles. By this method a material is secured so extremely hard that it will scratch glass. The shot varies in size from a powder so fine that it can be blown from the hand with a breath, up to larger particles about the size of duck shot.

The shot drilling method is very simple. The same principle is involved that is used in sawing stone. It is

CORES REMOVED BY A CALYX DRILL.



CALYX DIAMONDLESS CORE DRILL.

an old, old idea of sawing stone by using shot under the pressure of a blade of iron that is drawn back and forth in the same manner as a crosscut saw. This same principle is carried a little further with core drilling, the shot bit representing a circular saw.

The shot is carried through the hose and down the inside of the drill rods by a current of water, which is continually going down the hole. Just enough water is used to carry the shot down, not enough to lift the shot up off the bottom, while the slow current carries the lighter cuttings over into the calyx.

The consumption of shot depends altogether on the character of the material to be drilled. Slates, shales, limestone and ordinary sandstones require from one-quarter to three-quarters of a pound per foot. Very hard sandstone, granite, quartz conglomerate, taconite and jasper require from one and a half to four pounds per foot.

The chilled shot is useless in soft materials. But as hardness increases, its cutting properties appear and there has yet to be encountered a substance too hard to be cut by this method. A remarkable record was made in Canadian corundum rock, which had defied every previous attempt to core it with diamonds. The shot bit did the work economically and rapidly. Steel I-beams, old car couplings, steel plate, etc., have been encountered and penetrated in soundings. No substance seems to be able to resist the action of these tiny spheres of chilled steel.

We illustrate in this connection the Davis calyx diamondless core drill and examples of cores removed by it, which the Ingersoll-Rand Company claim deserve the special attention of those interested in mining drills.

Electric Motor Drive for Gold Dredges.

Alaskan gold mining companies are manifesting the spirit of the age by arranging for the substitution of electric power for steam. One company conducting dredging operations near Dawson City found that in order to take advantage of the electric power which is now available it was necessary to change the large "sluice type" steam driven dredge which has been in use in the past to the "stacker type'" electrically driven. The alteration of this dredge, which is the product of the Allis-Chalmers Company, of Milwaukee, Wis., necessitated the use of separate motors for each specific drive throughout the dredge, in addition to the substitution of new winches and gravel handling devices required by the change from sluice to stacker type. The motor equipment is made up of standard induction motors as follows:

The bucket drive motor is 100 H. P., 2,300 volts, for variable speed and reversing. A 50 H. P. constant speed, 2,300 volt motor drives 12-inch pump. Two variable speed 30 H. P., 440 volt machines drive the main and ladder winches. A 15 H. P. constant speed, 440 volt motor, operating at a speed of 1,130 RPH, operates the screen and stacker hoist. The stacker is driven by means of a constant speed motor, 15 H. P., 440 volt. A 3-inch primer pump is driven from a 10 H. P. constant speed machine. The stacker for the dredge has 80 foot centers and a belt 30 inches wide, driven from the top end by a motor.

This dredge has already established for itself a rather unique record. One of the strangest "clean-ups" in the history of mining is reported to have been made from it after a part of its run last summer in the sloughs of the Bonanza Basin. When the sluice box was opened preparatory to the periodical clean-up, after quite an extended period of operation, it was found that the bed of the slough, which had just been worked, had yielded an assortment of stuff the equal of which, according to the papers at Dawson City, had never been seen before in the mining regions of the West. The collection disclosed among other things two Russian bronze ikons, or sacred figures, which had probably been carried into the region by Russian explorers many years before the Klondike was heard of. These ikons were identical with those carried by some of the regiments of the Czar's armies in the late Japanese war. In addition to the ikons were found eight American pennies, about 100 pounds of unexploded cartridges, gallons of bullets, many of which had a coating of amalgam which necessitated their treatment for the gold adhering; 120 pounds of nails of all sizes, an alarm clock, a saw set, two massive gold charms, an opal with its setting from a broken scarf pin; innumerable pieces of watch chains; knives, forks, keys, locks, native bismuth, etc.

During the season many large clean-ups were made; the gold was coarse and nuggets worth from $10 to $20 apiece were recovered.

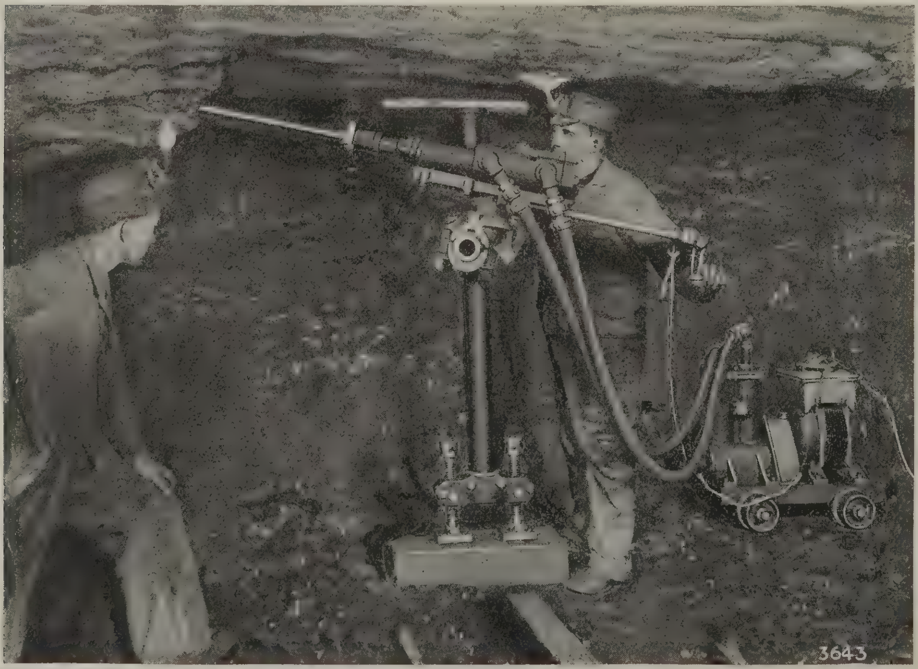
The Electric-Air Rock Drill.

For three years past practical experiments and thorough tests in the mines of Colorado have been carried on by the Ingersoll-Rand Company looking to a combination of the convenience and economy of the application of electricity and the pneumatic impulse principle, which it contends is and always must be the principle of successful rock drills. The perfected result, tested through three years' work of thirty machines in the severe conditions of practical tunneling, shaft sinking and regular mining work, has been put on the markets of the world within the past few months under the name of the Temple-Ingersoll Electric-Air Drill, a photograph of which is here reproduced.

All there is of an electrical nature about this machine is an electric motor of standard type. This motor drives what is really the simplest possible form of an air pump from which the inlet and discharge valves—which alone have limited the speed and endurance of air compressors —have been eliminated, removing also all the incidental difficulties. The result is a combination of an *air* drill—having little more to it than a cylinder and piston—with an electrically driven air compressor.

With the electric-air drill there is no piping in the mine. Wires are simply carried to a point near the working face; from this point an armored cable connection is led to the drill. Thus the permanent wiring is always beyond the reach of the blast.

The drill is claimed to be by far the simplest rock drill ever built—practically a plain cylinder with a piston in it, mounted on a 4½-inch column or a standard tripod. The compressor is duplex, single-acting, driven by reduction gears from an enclosed dust-and-moisture-proof electric motor, either direct or alternating current. The whole equipment is mounted on a steel truck, easily moved on or off the mine track. The impulses of air under a constant pressure of 30 to 40 pounds are transmitted to the drill from the compressor piston through two short lengths of hose. An impulse from one compressor cylinder throws the piston of the drill forward; the impulse from the other throws it back. The air is not released or exhausted, or used in the ordinary manner; it is simply compressed, expanded and recompressed, over and over again. The Ingersoll-Rand Company claim for this type of drill an economy of from one-third to one-quarter of the power at the power house.



ELECTRIC AIR DRILL IN OPERATION.

Electric Hoisting Engines.

The application of electricity as a motive power to hoisting apparatus for mining use is by no means a new development. However, radical changes and improvements are signalized in the types of such engines which the Lidgerwood Manufacturing Company, of New York, have recently perfected and which will be illustrated in their new catalogue. In the electric hoisting apparatus which this house first offered some of the standard features of their well known line of steam hoists had to be essentially modified because it was necessary to employ such electric motors as were generally obtainable and met their exacting requirements. In other words, the hoists had to be adapted to the motors. Gearing, for instance, had to be changed from the left hand to the right hand side of the drum, involving a certain awkwardness in operation. Now, however, the motors are being adapted to the hoists, which are being constructed to embody and maintain all of the old and best features developed by the years of experience in steam hoisting engines which the Lidgerwood Manufacturing Company have enjoyed, and of which they are justly proud. In the new type of electrically operated hoists the gearing is changed back to the left hand side of the drum, where it properly belongs and where it is always located in steam hoists. The operating levers are almost precisely identical with those used for a steam engine, the electric drive is turned virtually into an automatic engine and the operator's attention is left entirely free to watch for his signal. Numerous other features of interest and value are incorporated in these perfected hoists, which will be more adequately described in the manufacturers' forthcoming catalogue.

The care and attention which the Lidgerwood Manufacturing Company give to special requirements of export orders is well illustrated by a shipment they recently made to Peru. The total weight of this hoist is 13,800 pounds, but in order to meet the exigencies of the route over which it must travel it was built in sections, with no one piece weighing more than 300 pounds. The drums are each 48 inches in diameter, with 40-inch faces, and the hoist is designed for a duty of 3,000 pounds, to be lifted at the rate of 400 feet per minute. It is driven by a 37 H. P. induction motor and operated by a 440 volt alternating current, received from a power house a mile distant. This hoisting engine is destined for a large gold mining company whose operations are conducted 5,000 feet up the Andes Mountains and in the course of its travels it must be hauled for 100 miles over wagon roads and for 50 miles must be transported on mule back. It will in addition experience the vicissitudes of travel by steamship, steamboat and railway and its manufacturers may well claim that if able to meet successfully the conditions imposed upon them by this order they are prepared for almost anything that any part of the civilized world can demand.

Copper Smelting and Converting.

An unusually complete and up-to-date plant for smelting and converting copper has recently been shipped to customers in Chile by the Traylor Engineering Company, 56 Trinity Place, New York. This plant, which embodies the latest American ideas and improvements, is to be erected in the vicinity of Antofagasta, and is expected to be the forerunner of other similar installations. Among the plants recently installed by this company in foreign countries may be mentioned one in Russia, one in Mexico and one in Canada. A notable feature of the work of the Traylor Engineering Company is the turning over of plants in complete working order, the buildings being erected and the equipment built and installed. More than $3,000,000 worth of similar contracts are said to be now in hand, and at least three important plants for continental Europe are under tender by this company. Their new works at Allentown, Pa., occupy a plot of land of nineteen acres. The whole plant is operated electrically and forms an interesting study for those contemplating the erection of modern manufacturing establishments. Catalogues are issued, describing the company's special forms of concentrating mills, stamp milling and cyaniding machinery, furnaces and smelting accessories, etc.

One of the most complete and valuable catalogues of the season, dealing with cement making machinery, has just been issued by the Power and Mining Machinery Company, of Cudahy, Wis. The company's large line of cement making machinery is described in detail, and the book contains general information of interest and value to contractors and cement users.

The new Contractors' Catalogue recently issued by the Cyclone Drill Company, of Orrville, Ohio, will be found of especial interest to all railroad contractors and quarry people. Rod and cable drills for railroad and quarry work, blast hole loaders, water tanks, portable steam engines and boilers, and blasting supplies are described, and much other information of value to the users of such appliances is included.

IMPROVEMENT IN HOUSE FORCE PUMPS.

The combination house force pumps illustrated herewith will no doubt interest a large number of our readers, as the advantages and improved features embodied in their construction admirably adapt them for use in foreign countries. In the United States, although they have been on the market but a little over two years, they have met with widespread favor and the demand for them is a rapidly increasing one. As shown in the illustrations, all fittings and parts are interchangeable, thus making it possible for the dealer handling them to meet the requirements of his customer by simply altering any pump to suit the demand, a small wrench being the only tool necessary. To fully illustrate the advantages of this a larger cut is given here of Fig. 3, with check valve raised and the lower valve lowered, showing the valves in both places.

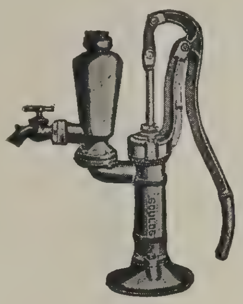


FIG. 1.

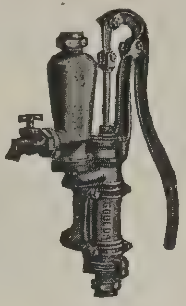


FIG. 2.

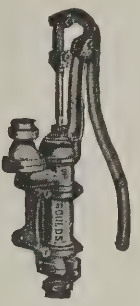


FIG. 3.

In the smaller illustrations are shown five extra parts, namely: A common spout, a cock spout, pump wall bracket, base and an air chamber with two discharge openings. With these extra parts any of the other pumps shown here can readily be constructed to meet any requirements. Besides this, as the pump brackets are made to simply grip the cylinder, either a right or left hand pump can be made.

As will be seen from the cuts, the cylinders and bearer tops of each of the sizes of Figures 1 to 6 are made from the same patterns and the air chambers, bases, spouts, and check valves are all interchangeable. A dealer can therefore have in stock any one of these pumps, together with a few each of the extra parts, and from these extra parts, by the use of a wrench, can construct any of the other pumps in a few moments and deliver whatever kind may be called for.

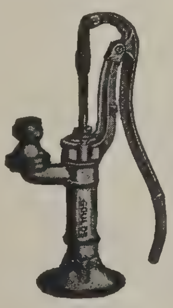


FIG. 4.

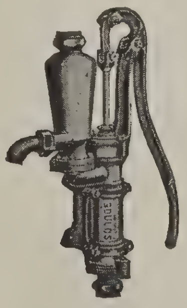


FIG. 5.

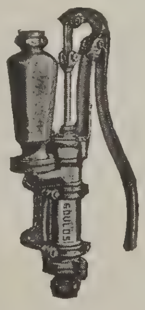


FIG. 6.

The bearer tops are secured with hook bolts so that the lever can be operated at any desired angle. The plunger rod is brass cased and works through a brass gland. The pump brackets for securing the pump to a wall or plank are in two pieces, made to strongly grip the cylinder. The cylinder can therefore be easily turned so the discharge will be at any angle and the lever operated from any convenient position, either right or left handed.

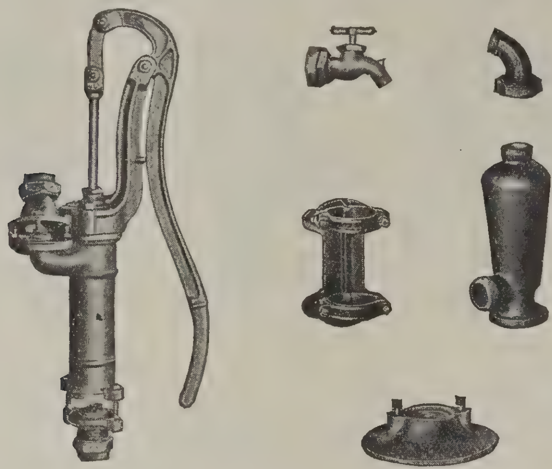


FIG. 7.

These pumps are the products of the Goulds Manufacturing Company, of Seneca Falls, N. Y., whose various products are known in almost every country of the world. The latest products of their manufacture, the pumps illustrated herewith, are meeting with pronounced success wherever introduced and the company is anticipating an equally large foreign demand for them. The pumps are made with polished iron cylinder, brass lined cylinder and brass body cylinder, handsomely painted for indoor use, making them ornamental in any kitchen.

MANUFACTURERS' NOTES.

John F. Allen, 370 and 372 Gerard Avenue, New York, recently shipped eight "Allen" boiler riveters, of 108-inch reach, to the American Car & Foundry Company for use in its new plant now in course of erection at Milton, Pa. This plant already has seventeen riveting machines of 96-inch reach. The eight machines just shipped are to be used on oil tanks for cars.

The Allis-Chalmers Company, of Milwaukee, Wis., has adopted the system of issuing small bulletins, designed for ready reference, giving in a condensed but comprehensive form information of general interest regarding some of the principal machines of its manufacture. The latest of these miniature bulletins to appear are Nos. 4002, 4003, and 4004, dealing respectively with "Direct Current Motors and Generators," "Electric Hoists," and "Polyphase Induction Motors." Those interested in mining machinery will find of value the reprint of the Bulletin 1403, just issued, dealing with the Hancock jig. Applicants for catalogues or bulletins published by this company should invariably state their official positions and the names of the companies with which they are associated.

"Ten-Wheel Type Locomotives," a pamphlet just issued by the American Locomotive Company, New York, illustrates and describes locomotives of this type, weighing over 150,000 pounds. It is a sequel to the pamphlet issued in January describing lighter designs of this type.

Thirty different designs are illustrated and the principal dimensions of each design given. The designs presented range in weight from 152,000 to 201,000 pounds and are adapted to a wide variety of road and service conditions.

The handsome new catalogue now being distributed by the Goodell-Pratt Company, the well-known toolsmiths of Greenfield, Mass., is unquestionably one of the most complete and valuable works of the kind issued this year. The book comprises 208 pages, devoted entirely to tools, and in addition to the extensive line heretofore manufactured the company shows nearly fifty new tools. The descriptions are complete and comprehensive, and are accompanied by illustrations which clearly set forth the important features of each particular tool. To anyone interested a copy of this catalogue will be mailed upon request.

The Electric Vehicle Company, of Hartford, Conn., reports that it is having a very large call in Cuba, Mexico, Argentina and other South American countries for its "Columbia" gasoline cars and electric vehicles. The demand includes gasoline cars of 40-45 H.P. and 24-28 H. P. in touring car and limousine styles, electric broughams, hansoms and victorias. The company's electric commercial vehicles, including delivery wagons and trucks ranging in load capacity from 1,000 to 10,000 pounds, are also meeting with growing favor in foreign countries. The company says that the Columbia victoria-phaeton is one of the most popular cars ever designed, especially for ladies, although a great favorite also with physicians.

The fact that there are over one thousand of its motor cars in use in New York City and vicinity has led the White Company of Cleveland, Ohio, to originate the novel idea of erecting a large clubhouse for the use of owners of such machines and their guests. The site chosen is in a locality very popular with autoists, being adjacent to the Long Island Motor Parkway. The general plan of the project is that of an exclusive country club. The building will be known as "The White House," and its central feature will be an immense garage. Restaurant and sleeping accommodations will also be provided, as well as many other conveniences designed to promote the pleasure and comfort of the patrons.

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A SOUND BASIS FOR AN EXPORT TRADE.

Comparatively little attention seems to have been attracted by that part of the report for 1906 of the United States Steel Corporation that deals with its export relations. Yet it supplies a striking refutation of the claim sometimes made that American manufacturers are "too busy with domestic business" to give any attention to foreign trade. On the other hand the intelligent and far-sighted policy inaugurated by the officers of this colossal undertaking is typical of the spirit that is being manifested by a constantly increasing number of American manufacturers.

Since the foreign business of all the subsidiary companies that make up the United States Steel Corporation was, late in 1903, concentrated in the hands of a single selling organization, marked advances have, we learn, been made in marketing goods abroad. Export shipments last year amounted to 1,079,319 tons of various products, an increase of 13 per cent. over the tonnage shipped in the previous year, while the gross receipts exceeded those of 1905 by 28 per cent. These figures certainly argue for the success of the policy adopted toward export business. Some of our English contemporaries have been quick to see the point, which they are repeating for the benefit of the British manufacturers. One of them describes it as follows:

"The aim of the corporation has been to build up a permanent and continuous export trade with a view to providing markets which at all times may be relied upon to absorb a fair proportion of the total production, rather than to sell material in foreign countries only at times when the domestic market is unable to take the entire output of the mills." "In pursuance of this policy," says the report, "better prices have been secured for material exported than would have been possible had the business been of an intermittent character, and offerings in foreign markets made only at times when accumulated stocks or a scarcity of domestic orders would have rendered export sales especially desirable."

We believe that we are quite within bounds in asserting that the disposition of American manufacturers to look on foreign trade as a "toy to be taken up or thrown aside at pleasure" is a thing of the past, if, indeed, such a disposition existed generally among the thinking and the successful representatives of our manufacturing industries. The report of the Steel Corporation simply puts into concrete form the present position of those American factories whose products are most deserving of consideration.

A FORGOTTEN DEBT TO ONE AMERICAN INVENTOR.

Lose a microscopic screw out of the works of your watch and the manufacturer of today has a hundred thousand duplicates, any one of which may in a moment be exactly fitted into a hole tapped for it. Knock off a sight from your rifle, an identical duplicate may be received by return of mail. Carelessly break the pulley of your lathe, a telegram to the manufacturer brings its counterpart in diameter, face, weight, bore and keyway. The manufacture of interchangeable parts is American in invention and American in development, and if sometimes lost sight of before the more dazzling brilliancy of such other discoveries of American genius as the application of electricity to power and light, the telegraph and the telephone, yet is scarcely second to them in its effects on manufacturing industries and the weal and prosperity of peoples.

Eli Whitney is known in history as the inventor of the cotton gin. The birth of our modern system of interchangeable manufacture is also due to him. In 1798 he began to study the duplicate production of parts in his shop at New Haven, Conn., but it is only within the memory of men today less than middle-aged that this system, which has established American reputation for superiority and cheapness in so many lines, has been adopted by many of our rival manufacturers in Europe. Whitney's desire was to produce cheaply the 10,000 muskets which the young Government of the United States had ordered of him. American watchmakers of today claim that it has only been by force of their example, or rather from the effects of their competition, that their older Swiss rivals reluctantly and but very recently have adopted our systems of mechanically producing in endless repetition parts so accurately identical that any may be drawn from the stockroom and assembled into a whole without the necessity for the smallest alteration. It has, then, required a full century for this idea to attain its present position as indispensable to the economical or even the satisfactory manufacture of thousands upon thousands of articles, machines or devices required by modern complex civilization.

Indeed, as a matter of fact, it is only within the last half century that real progress has been made even in the United States in the perfecting of systems of interchangeable manufacture, and only within the last two decades that precision tools have been produced capable of the absolute degree of accuracy that is indispensable. In this field American genius is by common consent pre-eminent, and if proof be needed it is supplied by a cursory examination of the stocks of American machine tools carried in European warehouses or by a study of our export statistics. Eli Whitney's brain evolved the basic idea; a hundred Americans through succeeding generations have developed, expanded and perfected means of reducing costs of manufacture, improving quality and usefulness of the product, and putting within reach of consumers articles which even fifty years ago they would never have dreamed of possessing.

THE PROGRESS OF THE UNITED STATES SINCE 1865.

Appropriately termed "a story of amazing contrasts" is the review of American progress since the conclusion of our civil war in 1865 which Charles M. Harvey contributes to the April number of the *Munsey Magazine*. Figures, usually dry as dust and stupid, here become picturesque and absorbingly interesting, not alone to the patriotic American but to the student of world progress. We have space for but brief extracts:

"In 1865 there were 35,000 miles of railway main track in the United States. There are 225,000 miles on April 1, 1907. The number of men whom the railways employ—1,500,000—is greater than the armies on the morning of Lee's surrender. For 1907 the revenue of the country's railways—$2,400,000,000—would pay the interest bearing debt of the Government of the United States twice over, and leave enough to support the Government for a year. Today the property of the American railways—$16,000,000,000—is as great as the wealth of the United States at the time of Lincoln's election.

"Between 1865 and 1907, both years being included, the United States' annual product of pig iron jumped from 832,000 tons to 27,000,000 tons, and its coal output from 10,000,000 to 400,000,000 tons. In the forty-two years the annual value of its aggregate mineral output has expanded from $150,000,000 to $2,000,000,000; its products of manufactures from $2,000,000,000 to $17,000,,000,000; the value of its farms and farm property of all sorts from $7,000,000,000 to $30,000,000,000; that of its farm products from $1,000,000,000 to $7,000,000,000, and the country's wealth from $20,000,000,000 to $118,000,000,000.

"In the four and one-fifth decades in which the country's population has been multiplied two and one-half times the value of its farms and farm property has been multiplied by more than four, its farm products by seven, its wealth by nearly six, its manufactured products by eight and one-half, its mineral products by thirteen, its pig iron by thirty-three, and its coal by forty.

"In the period in which these advances have been scored the people's savings bank deposits, which were $200,000,000 for the whole country in 1865, have swelled to $3,400,000,000 in 1907, multiplying seventeen times, while the population has been increasing two and one-half times. In the same four and one-fifth decades the interest bearing debt of the Government has been reduced from $2,200,000,000 in 1865 to $900,000,000 in 1907, a drop from $65 for each man, woman and child in the country at the former date to less than $11 to-day.

"The United States snatched the primacy in manufacturing from England in 1880, in iron and steel in 1895.

"With only 5 per cent. of the world's population, the United States in 1907 produces 25 per cent. of its gold, 30 per cent. of its silver, 40 per cent. of its iron, 42 per cent. of its steel, 45 per cent. of its coal, 50 per cent. of its petroleum, 60 per cent. of its copper, 75 per cent. of its cotton and 85 per cent. of its corn."

And "General Prosperity" still commands the situation!

PRODUCTION AND EXPORTATION OF AMERICAN HARDWARE.

BY JOHN BALL OSBORNE

(Chief Bureau of Trade Relations, Department of State, Washington, D. C.).

In conformity with the requirements of the act of Congress of March 6, 1902, a census of the manufactures of the United States is being taken along the lines of the census of 1900 and to supplement the results of that admirable work. The bulletin on the manufacture of iron and steel has not yet been published; but through the courtesy of Hon. S. N. D. North, the able Director of the Census, I have been permitted to examine the advance sheets of this bulletin, which forms a part of the census of manufactures of 1905, prepared under the supervision of Mr. William M. Steuart, Chief Statistician for Manufactures. Many interesting facts in regard to the production of hardware appear in the bulletin, although no attempt has been made to differentiate that class of products.

It is stated that the iron and steel production as a whole for the calendar year 1905 was abnormally and phenomenally large and the industry uniformly prosperous. The value of total products was $905,854,152, being an increase of 12.7 per cent. over the figures for the census year 1900. The following table gives the values at each census since 1870:

Census.	Value of Iron and Steel Products.	Per Cent. of Increase.
1870	$207,208,696	....
1880	296,557,685	43.1
1890	478,687,519	61.4
1900	804,034,918	68.
1905	905,854,152	12.7

A striking evidence of the concentration that has characterized this great American industry in the last thirty-five years is shown in the fact that, while the number of establishments has decreased from 808 in 1870 to 606 in 1905, the capital invested has increased nearly sevenfold—from $121,772,074 to $948,689,840—and the value of products more than threefold, as already shown.

In the production of all iron and steel products in 1905 the leading States were Pennsylvania, $471,228,844, or 52 per cent.; Ohio, $152,859,124, or 16.8 per cent.; Illinois, $87,352,761, or 9.6 per cent.; New York, $29,862,136, or 3.3 per cent., and Alabama, $24,687,359, or 2.6 per cent. of the products. It is interesting to consider the relative rank of these States with reference to the census of 1900. Pennsylvania, Ohio and Illinois stood as above, but New York was eighth instead of fourth, and Alabama sixth instead of fifth, while New Jersey, now sixth, ranked fourth.

The following table shows the value of certain lines of hardware produced by American steel works and mills in 1905:

Kind of Products.	Value.
Cut nails and cut spikes:	
Iron	$400,846
Steel	1,732,064
Combined iron and steel	261,198
Iron and steel wire nails	17,495,362
Iron and steel wire	30,992,672
Other wire products	19,063,409
Iron and steel bolts, nuts, rivets, forged spikes, washers, etc	13,854,635
Iron and steel wrought pipe or tubes	43,985,728
Iron and steel seamless drawn, clinched, brazed, etc., pipe or tubes	2,290,234
Iron and steel springs, car, carriage, furniture, and all other	1,708,632
Stamped ware	292,923
Shovels, spades, scoops, etc	410,500

The foregoing table, however, does not represent the total production of each item enumerated, since it covers simply the output of rolling mills or steel works. Including other manufacturing establishments, the total nail production in 1905 reached a valuation of $32,830,196, itemized as follows:

Wire nails	$24,300,351
Cut nails and cut spikes	2,684,449
Horse nails	2,345,762
Tacks and small nails	1,664,161
Shoe tacks and shoe nails	988,144
Miscellaneous products	847,329

In addition to the wire products of the rolling mills there were many establishments that purchased wire rods and manufactured therefrom wire products to the value, in 1905, of $17,362,395, chiefly barb wire, wire nails, field fencing and poultry netting. It appears that the aggregate value of the products of the wire industry of this country in 1905 was $83,353,956, as compared with $52,871,387 in 1900, or an increase of 57.7 per cent. in five years. This is indeed a formidable showing.

It is regrettable, for our present purposes, that the official census statistics do not give in detail the production of the various classes of hardware goods, such as tools and implements. The figures presented above, however, will suffice to show the enormous activity in this branch of American manufacturing industry. We will now consider the distribution in foreign countries of the surplus of these products, so far as the export statistics of the Department of Commerce and Labor permit.

In the fiscal year ended June 30, 1906, the value of our total exports of locks, hinges and other builders' hardware was $6,186,225, of which Europe took $2,497,758; North America, $2,037,544, and South America, $469,103. The exportation was principally to the following countries:

Europe—	
United Kingdom	$771,248
Germany	543,672
France	385,426
Netherlands	155,096
Belgium	140,373
North America—	
Canada	1,047,658
Mexico	547,028
South America—	
Argentine Republic	160,103
Chile	95,036
Brazil	80,874
British Australasia	569,701
British South Africa	213,321
Japan	112,482

The total sales in foreign countries of American made saws in 1906 amounted to $671,312, as compared with $319,464 in 1902, a gratifying increase. The principal countries of consumption were as follows:

Europe (total $157,200)—	
United Kingdom	$100,285
Germany	25,292
Belgium	10,672
North America ($267,224)—	
Canada	184,399
Mexico	27,770
South America ($90,394)—	
Argentina	35,984
Chile	34,123
Brazil	6,909
British Australasia	125,929

Miscellaneous tools were sold abroad to the value of $6,608,469, as against $3,586,482 in 1902, an increase of 84 per cent. This is certainly an excellent showing for a period of four years, especially when it is borne in mind that American manufacturers have, increasingly, to contend with close imitations of their products that are made in Europe under cheaper labor conditions and put on the market slightly more advantageously and not infrequently under the guise of American manufactures. This exasperating trade policy is encountered perhaps oftener in the case of small tools and implements than any other articles; but the export statistics confirm the reports of our consular officers to the effect that the markets for American tools are steadily widening. The principal purchasing countries in 1906 were as follows:

Europe (total $1,937,977)—	
United Kingdom	$1,072,187
Germany	325,968
Russia	122,154
Netherlands	73,874
Belgium	66,166
North America ($2,181,924)—	
Canada	948,512
Mexico	568,197
Cuba	411,949
South America ($1,213,323)—	
Argentine Republic	537,646
Brazil	329,987
Chile	107,251
Peru	72,532
Ecuador	53,514
British Australasia	776,768
Japan (only $43,390 in 1902)	168,942

The total exportation of American table cutlery in 1906 was valued at $63,683, of which $28,550 was taken by Canada, $5,645 by Cuba, $5,043 by Brazil and $4,334 by the United Kingdom. In this line England is, of course, our strongest competitor in all foreign markets, and the sales in that country probably represented novelties and specialties. There is every reason why the exports of table cutlery to North and South America should henceforth develop rapidly.

The exports of all other kinds of cutlery were valued at $503,180, of which Canada took $119,219, the United Kingdom $85,764 and Germany $28,411.

Cut nails and spikes were shipped abroad to the value of $314,485, of which $71,320 went to Cuba, $59,141 to Chile and $35,782 to Japan. In the same year the exports of wire nails and spikes were valued at $2,095,488, the United Kingdom purchasing $444,007, Japan $561,782, China $199,022 and British Australasia $174,807. All other nails, including tacks, were exported to the value of $426,445, of which $97,131 went to Mexico and $88,683 to the United Kingdom.

The foreign sales of American stoves, ranges and parts of same amounted in 1906 to $1,188,967, distributed among the leading purchasing countries as follows:

Europe (total $88,278)—	
Germany	$24,392
North America ($710,198)—	
Canada	514,359
Mexico	111,728
South America ($131,327)—	
Argentine Republic	80,835
Chile	32,334
British South Africa	108,274

It is a gratifying evidence of the growing appreciation of this class of American goods to note that the sales in British South Africa exceeded $100,000. In fact, our Consul at Pretoria reported not long ago that the United States has made notable gains in the hardware trade since the close of the Boer war, while the mother country has sustained a corresponding loss. Germany has also greatly increased her trade. The following table of imports of hardware into the Transvaal is significant and highly encouraging to American manufacturers:

From	1903.	1904.	1905.
England	$1,022,000	$2,519,000	$2,047,000
America	172,000	530,000	591,000
Germany	93,000	333,000	440,000

While the American ax is not needed in the Transvaal, by reason of the absence of timber and forests, the Consul reports that American hatchets will always be in demand for building purposes.

It is rather curious that the British consular officer at Caracas should have reported recently to his government that precisely the same change in trade conditions as regards hardware is going on in Venezuela as was described by the American Consul at Pretoria, namely, that England is steadily losing ground in an acquired field, while the United States and Germany are increasing their sales. He pointed out that there is no reason why America should not soon excel in all the special branches that have hitherto been regarded as the exclusive domain of the British hardware trade, unless his compatriots made determined efforts to preserve the markets of Venezuela and other South American countries.

Consul General Hanna, of Monterey, reports that general hardware is a business in which the United States has a large lead in Mexico, nearly all shelf hardware being supplied by this country. American tools, he says, are found to be superior to those imported from any other country. On the other hand, England controls the trade in pocketknives and Germany that in table cutlery. As a rule, the European goods in these lines are slightly cheaper, but rarely superior to the American manufactures.

Expert observers of European trade conditions agree that American hardware manufacturers are securing but a small part of the business that is open to them in Europe, for there are thousands of articles that might be sold, with a fair profit, if once properly and systematically introduced. In selling to the foreign trade, however, it is very important for American manufacturers to protect themselves by trademarks and patents on the names as well as the mechanical features of their goods.

Vice-Consul Piatti, of Nice, states that Italy offers a good market for American building hardware. During the past few years a few specialties, in the shape of American locks, have come into use, but this does not, in his opinion, represent even a fractional percentage of the field open to such and kindred articles. He also calls the attention of American manufacturers of heating appliances to the fact that many house owners at Nice are putting in heating plants, and in a recent instance a large part of the materials was of American manufacture.

Consul Mansfield, of Lucerne, stated in a recent report that most of the saws used in Switzerland are imported from the United States, including practically all the crosscut saws employed in cutting logs. He says that the American mill saw is universally recognized as a superior article, although the higher price asked for it enables German manufacturers to find a market in Switzerland for the inferior article.

I quote the following extracts from a report made to the Department of Commerce and Labor last October by Special Agent Burrill on the hardware trade in Australia, especially the western section:

"Among the American made commodities which control, or are largely represented, on the market, are saws, axes, edged tools of all kinds, files, harvesting and garden implements and carriage woodware. In the big show windows of the larger retail hardware stores of Perth, Fremantle, Kalgoorlie, Albany, Bunbury and other Western Australian cities American goods are prominently displayed and present an attractive appearance. An Australian hardware store without American wares would be about as interesting to the average buyer as a theatrical show with the star part omitted. The wooden pulley blocks used on vessels of all kinds are imported from the United States and give excellent satisfaction."

Special Agent Burrill also reports in regard to the importation of fencing wire in Western Australia, which he says has assumed a commanding importance in trade, and competition between American and German manufacturers is keen to supply the market. Their respective quotations for barbed wire vary but little, and because of the excellent quality of the American make and the satisfaction it has uniformly given in the colony it finds a ready sale, even though the price may sometimes exceed that of German manufacture.

From another source it is learned that rabbit-proof wire netting is in great demand throughout Australia and will continue so for years to come. It is stated that New South Wales alone has constructed over 40,000 miles of this fencing. In a recent report from Auckland Consul Prickett says that inasmuch as New Zealand has not been seriously troubled, except in a few places, by the rabbit pest the greater part of the fence wire in use in that colony is galvanized barb wire; but that during the last five years woven wire has been having a limited sale. There is a heavy demand for wire netting, and the consul recommends that American manufacturers of woven wire fencing send competent men to that country to investigate the subject with a view to securing a share in the trade.

Consul General Ridgely, of Barcelona, reports that it has been intimated that in some instances German tools unmarked with the name of the country of origin have been sold as American products. This practice is not illegal, as there is no Spanish law or treasury regulation that requires imported merchandise sold in Spain to be marked with the name of the country of production.

Consul General Skinner, of Marseilles, believes that American locks might be introduced to advantage throughout France, for the ordinary French lock is inferior and the key cumbersome. At the present time the trade in imported locks in France is not large, amounting in 1906 to only $145,136. Such American locks as he found at Marseilles had filtered through from general agencies in Paris.

PERSONAL BUYING TRIPS TO AMERICAN MARKETS.

BY AN AMERICAN HARDWARE SALESMAN.

Many lines of American hardware have been so widely introduced throughout the world, and for so many years, that too many foreign buyers are prone to fancy that our manufacturers have nothing in addition of interest or value to them. That this is a mistake has been proven to their ample satisfaction by scores of merchants who have personally visited the New York market or the establishments of American manufacturers. The practice of making such occasional buying trips is a growing one on the part of large and progressive merchants, and it is rarely indeed that the time and expense involved is not pronounced a profitable investment. Buying from catalogue is and always must be a very unsatisfactory proceeding, and yet in ninety-nine cases out of every hundred it is the only course left open to the merchant in foreign countries who does not himself visit the original producers. True, some American manufacturers, of hardware, for example, occasionally send their traveling salesmen to important foreign markets with lines of samples thought most suitable for their supposed requirements, and other and still more limited assortments may occasionally be inspected in the hands of other agents less qualified to promote the interests either of buyer or manufacturer. But no American salesman who has ever visited markets in other parts of the world in search of business has failed to regret the inadequacy of his sample collection, to wish some of his samples at the bottom of the sea, and mourn over the omission of others that might have been productive of large orders. And yet probably no such salesman has ever made a foreign trip without having been surprised and delighted by occasional opportunities for the introduction of new export goods and without having noticed on more than one occasion the satisfaction expressed by his customers, actual or potential, at the opportunity of inspecting lines of American manufacture with which he had not previously been acquainted.

The hardware merchant who personally visits the United States brings with him a shrewd and thorough knowledge of his own market and its requirements, and he finds here not only the well known lines of butts and hinges, padlocks, latches, doorknobs, carriage hardware, coffee mills and meat choppers with which he has been for years familiar, but he finds scores of other articles made by the same manufacturers whose nature or quality he has failed to comprehend from catalogue description, and he finds hundreds of competing manufacturers, whose goods may present advantages in design, quality or price, to whose existence he would never otherwise have given a passing thought.

One of the most curious trade features noticed by the American foreign traveler is the fact that he will find a large and thriving business being done in one city in certain lines of American goods, but on investigating a neighboring city, of precisely the same characteristics and within the borders of the self-same State, he will discover that not a single article is sold of those lines popular in the first city, but perhaps other and different lines, unknown in the latter place, are favorites there. There is but one explanation of most such cases—haphazard introduction. One merchant happens upon an article that commends itself to him. He buys it, is successful, and his competitors imitate his example. Of other articles he knows nothing, nor do his neighbors think it worth while inquiring. But in the second city, though only a hundred miles away, conditions happen to be exactly reversed. These "happenstances" are at once ridiculous to the point of absurdity and exasperating in the lessons they carry of wasted opportunities.

If American goods, in the ironmonger's line or any other, are worth buying at all, they are worth a thorough and conscientious study. The manufacturer who produces one article suited to local requirements, and at a satisfactory price, can probably compete in others also. If prices appear to be cheap, but style or mechanism is not exactly adapted to local requirements, it is altogether likely that with an accurate knowledge of the facts before him the manufacturer might make a special article to meet the exigencies of the market, or some of his numerous American competitors may already have it. Even a brief survey of the American markets in person will determine how and to what extent the foreign merchant can do business in the American markets to a hundred times greater advantage than any possible dealings either with salesmen or catalogues.

But there is another and even more important feature of personal buying trips to America. There are scores of lines and hundreds of articles made in this country that are entirely suited to foreign trade, but that are not catalogued, or, if so, cannot be represented or described in type or engraving in such a manner as to command inquiries, to say nothing of orders. While this is true to a certain extent of the hardware trade *per se,* it is more noticeable and emphatically the case in a great number of articles that until personally brought to their inspection entirely escape the "universal providers" or "department stores." To illustrate this point in concrete fashion, the last summer's visit to the United States of two gentlemen, the heads of a chain of ten large general stores in the Far East, may be cited. The writer enjoyed the privilege of escorting these gentlemen about New York, and among the goods which were found desirable in style, quality and price, for which orders were placed and in which a thriving business has since been done, may be mentioned fancy boxed stationery, wooden and cast iron toys, leather belts and ladies' bags, silver toilet articles and tableware, watch chains and jewelry in great variety, celluloid and other composition brush, comb and mirror sets and novelties of many descriptions, traveling bags, gentlemen's shirts, collars, neckties, etc., etc.

Most of these goods are never catalogued, owing to the variety of styles and frequently varying fashion of the day. Catalogues of others convey but a faint idea of actual appearance and none at all of quality. The visitors in question expressed themselves as certain of the profitable nature of their investment in the American trip, and as determined to include future visits to this country in their annual pilgrimage to Europe, which, however, they expect to vary hereafter by making their first stop in the United States.

The American Exporter will gladly welcome visiting merchants, and freely extends to its readers the hospitality of its offices during their stay in New York. Assistance of every sort will be extended, interpreters in any language supplied and every effort made to render the visit pleasant and profitable, and all without charge or commission of any kind. The American Exporter does no merchant, agency or shipping business, nor has it any connection whatever with any such house. Its business is purely and solely that of publishers, and as such its duties are restricted to an independent devotion to the best interests of its subscribers and readers on the one hand, and of its friends who carry their business announcements in its columns on the other.

THE TARIFF AGREEMENT WITH GERMANY.

The State Department has made public the text of the commercial agreement between the United States and Germany. In the preamble it is declared that it is desired to adjust the commercial relations between the two countries until a comprehensive commercial treaty can be agreed upon.

It is agreed on the part of the United States that certain German articles shall be subject to reduced tariff rates, and reciprocally the German Government concedes to certain products of the United States the minimum German tariff duties. It is understood that the list comprises about 97½ per cent. of the total imports from the United States into Germany.

The agreement is to take effect on July 1 of this year and to remain in force until June 30, 1908. In case, however, neither country shall have given notice six months before the latter date of its intention to terminate the agreement it will remain in force until six months from the date when either shall notify the other of its intention to terminate the same.

A FEW SUGGESTIONS ON MEXICAN COMMERCIAL LAWS.

By E. Dean Fuller, Attorney-at-Law, Mexico City.

Losses are bound to occur to every business man, no matter how careful he may be in extending credit; but prompt action, directed by a knowledge of conditions and of the laws, will reduce them to a minimum.

Some knowledge of the laws of a foreign country is indispensable to the exporter, as delays in securing it, when conditions demand prompt action, may prove fatal to his interests.

As illustrative, take the laws of Mexico. No attorney can legally represent his client unless he possess a legal power of attorney from him. He cannot appear in court, either to prosecute for or to defend him, without this power of attorney. His hands are absolutely tied.

Therefore, when prompt action may be required to protect a creditor, or where the attorney's authority is liable to be questioned, he should be furnished with this power of attorney at the earliest possible moment.

These powers are of two kinds, and are called "letter powers" and "full powers," of which every exporter to Mexico should have a supply on hand.

The "letter power" may be used when the amount involved is less than $500 United States currency. The "full power" is required in all cases where the amount involved is in excess of $500 in the currency of the United States.

The "letter power" need only be signed by its author, witnessed by two witnesses and have a five-cent Mexican documentary stamp affixed and canceled.

The "full power" must be signed and witnessed in the same manner, but requires, in addition, the signature of a notary public, which latter signature must be certified to by a clerk of a court of record. The clerk's signature must then be certified to by the nearest Mexican consul. When so executed the instrument must be forwarded to the City of Mexico, to be there legalized before the Federal authorities.

Taking the laws of Mexico as a whole, they provide far greater protection to the creditor than do those of the United States, and the only causes of complaint against them are the technicalities of court proceedings, which prolong litigation.

Attachment laws exist, against both debtor and his property, and upon much more liberal grounds than in the States. No bonds are required to institute them.

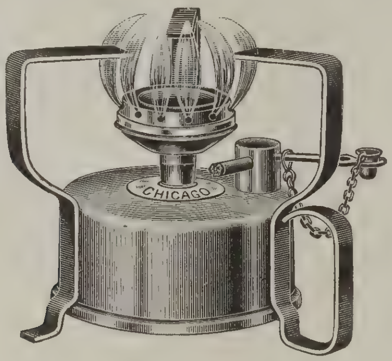
The statutes are filled with laws for the prevention of frauds and provide severe punishment for their commission.

But a knowledge of the technicalities of the law is unnecessary for the business man. That is his attorney's business.

What he should know and keep ever before him in his business with Mexico is that his attorney will be powerless to act unless he possess the indispensable power of attorney, and that any delay in furnishing it will mean time wasted and an account perhaps lost.

SOME HARDWARE SPECIALTIES AND NOVELTIES.

It may be, as some one has observed, a poor day that does not see the announcement of some new invention of American genius destined for the shelves of the hardware trade both at home and abroad. Practical or fanciful, useful or ornamental, some of these inventions survive, some disappear quickly from notice, some leap at a bound into worldwide favor, some of them win their way only through a long and painstaking course in the education of the public to their advantages. To the class in which are numbered novelties tried and proven belong the several articles selected for description and illustration in this number of the American Exporter. All of them have already received the seal of trade approval, not only at home in the United States but more or less widely in foreign markets.



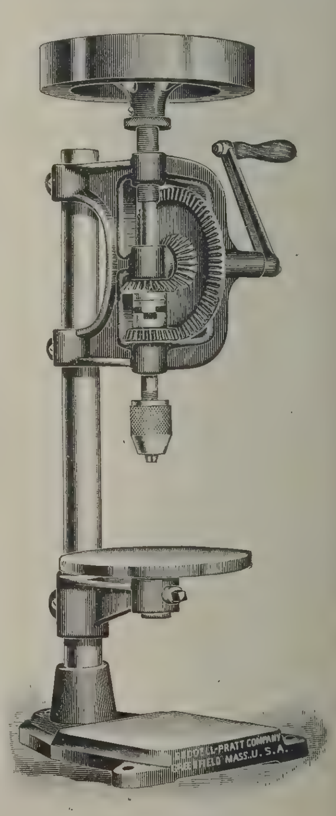
ALCOHOL STOVE.

Alcohol Gas as Fuel.

A variety of alcohol stoves is known to the trade. The one here illustrated differs from others in that it burns alcohol gas, which it generates itself while the flames are burning. The advantages claimed for this stove over others, whether alcohol, gas or oil, include: Production of more heat, with a consumption of only one-eighth the quantity of fuel; impossibility of explosion; odorless and smokeless flame, producing no soot; invisible wick, protected by asbestos, hence superior durability. Its manufacturers, Glogan & Co., 1053 Dickey Building, Chicago, Ill., state that although this stove has been on the market for only a few years it has already gained a wide approval in many foreign markets. They illustrate the strong construction of the stove with the statement that although it weighs only 210 grammes it can support a weight of 50 kilos. Any kind of alcohol can be used and the reservoir, having a capacity of about 210 grammes of alcohol, is of sufficient capacity to obviate the necessity of refilling every time the stove is used.

Enameled Metal Tiling.

In the course of the past two or three years American manufacturers of enameled metal tiling have attained a high degree of perfection in their products, and progress in technical and artistic qualities has been accompanied by notable reductions in cost, so that today products of American factories in this line are favorably known in many different markets, particularly in Australasia, South Africa and South America. As is generally understood, this material consists of thin plates of a noncorrodible white metal, highly enameled and embossed in a great variety of colors and designs, finished to represent the finest ceramic tiling, for which it forms a perfect substitute. "Enametile" is the trade name given to their product by the New York Metal Ceiling Company, 537 West Twenty-fourth street, New York, who rank among the principal American manufacturers of these goods. In discussing the advantages claimed for this form of tiling its makers point out the fact that besides being adapted for walls and waiscotings in every respect equally as well as any ceramic tiling ever made, "Enametile" has the added advantage of being entirely suitable for ceilings. One square foot of ceramic tiling weighs about five pounds, while the same area of this product weighs only about six ounces. Metal tiling is affixed directly to finished plastered walls with a specially prepared cement, the joints are flushed out and made level, leaving no lurking place for vermin, dirt or germs, and, furthermore, may be washed and kept clean with soap and lukewarm water. In point of economy "Enametile" is claimed to cost only from one-third to one-half as much as ceramic tiling, over which it also has the enormous advantage of being perfectly flexible, conforming readily to curved surfaces. In fact, it is easily cut with a pair of ordinary shears and can be bent as square or curved corner, or carried over pipes, without breaking the enameling. It is impossible to reproduce here the coloring and the charm of the great variety of designs illustrated in the manufacturers' catalogue, which shows patterns suitable for every variety of room in private residences, business offices or public buildings.



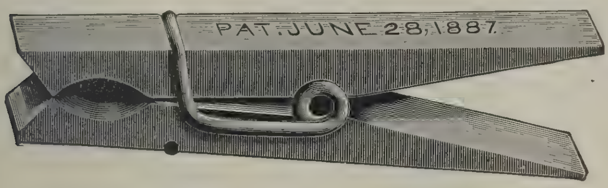
BENCH DRILL.

An Improved Bench Drill.

A new model of bench drill has recently been added to their already extensive line of tools by the Goodell-Pratt Company, of Greenfield, Mass., which has already met with the cordial approval of the trade. This drill, as illustrated herewith, measures 27 inches in height and weighs 70 pounds packed for export. It is fitted with cut gears, with a three-jawed chuck having a capacity of 0 to ½ inch, and with two tables, one oblong and stationary, the other round and swinging, and has two speeds regulated by a cam attached to a shifter knob. The rectangular table measures 7x6 inches and the round table has a diameter of 7 inches.

Spring Clothes Pins.

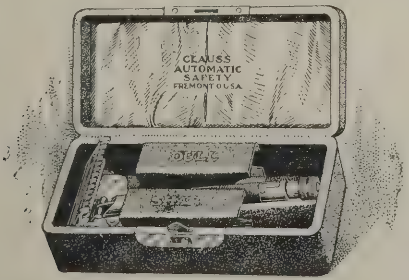
The magnitude of the foreign demand for American clothes pins is one of the features of our export business that never fails to astonish the uninitiated. Shipments in carload lots of the American standard, about 30,000 pounds, are by no means unusual, while the casual tourist in Europe and even in the remote corners of the globe is constantly puzzled and amused by the persistent invitations of street hawkers among whose stocks in trade a supply of our spring clothes pins is included. Investigation frequently develops the fact that the article so offered is almost as frequently sold for office use as for its original purpose, for many a foreign office man uses American spring clothes pins as letter clips. But for whatever purpose bought the business is a large one, and manufacturers in this line employ large capital as well as ingenuity that seeks constant improvement in their products. The United States Clothes Pin Company, of Montpelier, Vt., are calling attention to a new model which, it is claimed, presents features of great value. The construction of this pin, an illustration of which is shown herewith, is very simple, merely consisting of two pieces of kiln-dried hardwood and one piece of galvanized spring steel wire. Its manufacturers claim that it never splits, is so galvanized that the wire cannot rust, and having no peg, pin or rivet has nothing about it to get out of repair and hence will last indefinitely.


PAT. JUNE 28, 1887.

IMPROVED CLOTHES PIN.

An Automatic Safety Razor.

Safety razors are claimed to be an American invention. In any event it is the product of our factories in this line that is most favorably regarded and most largely sold in every civilized country in the world. One of the types of safety razor that has enjoyed great popularity of late is that which is sold with an equipment of a number of thin wafer blades, and of tools of this variety perhaps the newest model to be placed on the market is that offered by the Clauss Shear Company, Fremont, Ohio, and 9 Warren street, New York, a photograph of which is reproduced herewith. Two noteworthy claims are made for this razor. It is automatic and the parts are so connected that there is no danger of losing one of them. To open it is only necessary to press a small button, turn it slowly, when the frame is caught and held open and a wafer blade placed in the holder. Each razor is sold with twelve wafer blades, which, as well as the frame itself, have all been passed through an acid solution rendering them thoroughly antiseptic. It is genuine silverplate throughout and, while only just beginning to be advertised, already commands a sale of over 100 dozen a day.



SAFETY RAZOR OUTFIT.

Double Rotary Washing Machine.

American washing machines have within the past few years developed into a staple export line of growing importance. The model illustrated with this article presents some features which its manufacturers (Wiard Manufacturing Company, East Avon, N. Y.) claim do not exist in any other machine on the market. For example, the Wiard washer possesses a double rotary motion, the tub revolving in one direction, while the upper disk is at the same time rotated in the opposite direction by means of a gearing. There are no trips, cams, springs, or other complications and its simplicity in construction contributes also to ease in operation and faster washing on account of the greater circulation of hot water and soapsuds. Another notable feature in this machine is the fact that it can be separated into three parts, the tub, the frame and the yoke, materially assisting in moving from one place to another, which, in the case of other washers that must be moved bodily, often requires strength beyond that of the average woman. Bearings

WASHING MACHINE.

are all machine bored and reamed, castings galvanized throughout and every possible attention given to avoiding wear on the clothes, which, it is claimed, is in this machine reduced to a minimum.

Novelty Savings Banks.

Advertising and "premium" novelties are always in demand, not only by enterprising merchants but by an increasingly large number of banking institutions. Many banks have adopted the use of small home or pocket money boxes, given freely to would-be depositors as a means of encouraging thrift and small savings and the ultimate opening of a deposit account in their institution. One of the newest devices of this sort, called by its manufacturers, Victor M. Grab & Co., Chicago, Ill., the "Horse-Shoe Money Box," is illustrated herewith. It is neat in design and so small in size that it can conveniently be carried in the pocket or even suspended from the watch chain. Intended to hold ten coins of about the size of an American ten-cent piece it opens automatically upon the deposit of the tenth coin. The "Basket Bank," which is manufactured by the same firm, is made of oxidized copper or nickel and is said already to be a favorite "premium" with many merchants and large publishing companies in the United States. Each coin as it is deposited is duly registered by an automatic figure counter on the face of the bank, which thus always shows the exact amount contained within. The automatic locking device employed is quite unlike any other and renders the extraction of money impossible except on the deposit of $5 or its equivalent or some multiple of such sum, its total capacity being $30 in United States silver. The manufacturers have a London office for the benefit of their large and increasing foreign trade in the various novelties that they produce.

KEYLESS BASKET BANK.

DIME SAVINGS BANK.

Tubular Lanterns.

Lanterns were made in America long before the discovery of coal oil or kerosene, but that discovery of such far-reaching importance necessitated the invention of oil-burners and the development of the tubular principle with its superior light-giving power. The pioneer in this industry in America was Mr. R. E. Dietz, whose first factory was established in 1840 and which has now developed into the three great plants operated by the R. E. Dietz Company with a total floor space of nearly 212,000 square feet. Besides its main office and works in New York and a large factory at Syracuse, the company has recently erected a third plant larger than either of the others. This company claims the distinction, too, of having been the first to introduce an automobile lamp made on its popular tubular cold-blast principle, and was the first in the United States to undertake the manufacture of lamps for automobiles on a large scale. About one-quarter of the combined products of its three factories is exported, London and Paris especially being large and regular customers for automobile lamps. A London office is maintained and traveling salesmen visit all the principal markets of the world in the Dietz interests.

A New Pipe Vise.

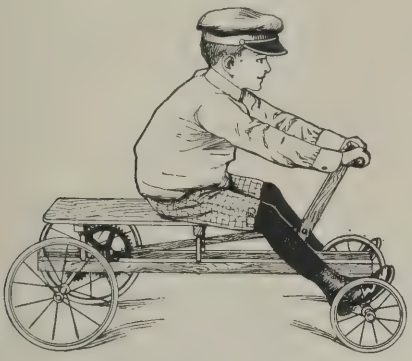
The "Vulcan" chain pipe vise which J. H. Williams & Co., of Brooklyn, N. Y., have lately put on the market has met with a very favorable reception in this country and will probably commend itself to the many customers abroad of this firm's well known "Vulcan" chain pipe wrenches. The principle of construction is the same in the vise as in the wrench, but involves a radical departure from the accepted type of pipe vise. The chain which hugs the pipe half way around is hand made and identical with that used in "Vulcan" wrenches, the action is quick and novel, and the tool, of wrought steel, with drop-forged jaws renewable by simply filing the teeth, is practically unbreakable. But in addition this device is so compact that it is easily carried in hand or tool bag and for outside work would seem to be almost a *sine qua non.*

Schools of Art in Metal Ceilings.

The use of light sheet steel, stamped into designs of more or less artistic merit, is by no means new either in the United States or in most other countries. It has remained, however, for the La Crosse Cornice and Ceiling Company (of La Crosse, Wis.) to supply the intending buyer of similar material with a guide which ought greatly to assist the novice in the selection of pure designs of genuine artistic worth. The illustrated catalogue of this concern classifies its forty or fifty designs of steel ceilings under the following heads: Greek, Colonial, Rococo, Romanesque and Gothic. The La Crosse company claims to employ the highest priced and most efficient artist designers available, and that fact, together with the classification of designs into different schools, should help the builder in his choice of decorations of artistic fitness.

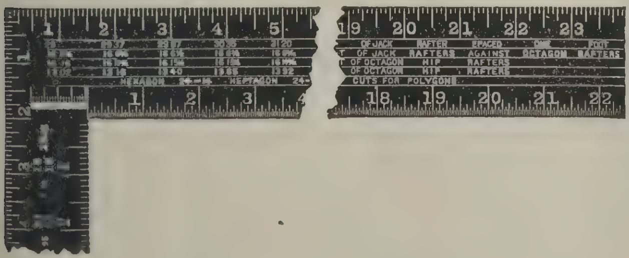
Children's "Automobile" Wagons.

For many years foreign hardware and toy dealers have profitably imported thousands of American velocipedes annually for the local small boy. More recently it has been discovered that a large and remunerative trade also awaits the introduction of other American toys and novelties for children. In line with the so-called children's "automobiles" comes a new wagon which is said already to have created for itself almost as much popularity abroad as at home. "The Irish Mail," as it is christened by its manufacturers, Hill-Standard Manufacturing Company, of Anderson, Ind., is claimed to be the only car of the sort in the market built on entirely correct principles. It is geared for speed, yet built so low that danger of upsetting is minimized. Steel and hickory wood combine to ensure durability under rough usage, and the fun provided for the boys is second only to the profit realized by the importer. Thousands have already been shipped abroad.


"IRISH MAIL" HAND CAR.

A Useful Framing Square.

The square illustrated herewith is devised especially for roofing work. The Nicholls Manufacturing Company, Ottumwa, Ia., who are its manufacturers, claim that it is the only square made which clearly indicates to the carpenter all necessary figures for all cuts and lengths of every kind of roof, saving much time and labor in referring to books and papers. These squares are cut out of a solid sheet of steel and have no welds, with consequent gain in strength, freedom from danger of breaking at the corner and less liability of getting out of true.

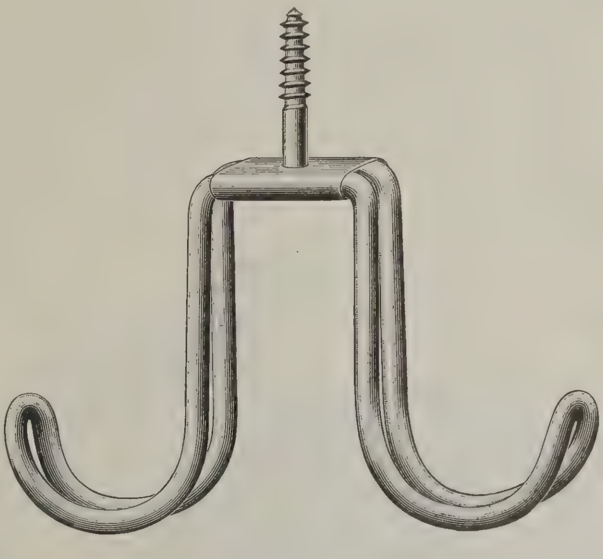

NEW FRAMING SQUARE.

Ceiling Hooks of Wire.

Complaint has sometimes been made that wire ceiling hooks heretofore marketed have been subject to the weaving and working of the wires of which they are made. In the Bradley "metal clasp" hook, its maufacturers, the Atlas Manufacturing Company, New Haven, Conn., claim to have entirely obviated this objection in the feature that gives the line its name, a metal clasp, which grips all the wires together in a bunch at the base of the hook, ensuring perfect rigidity and strength. This feature is distinctive and will readily be appreciated from the accompanying illustration.

Yankee Hardware Novelties.

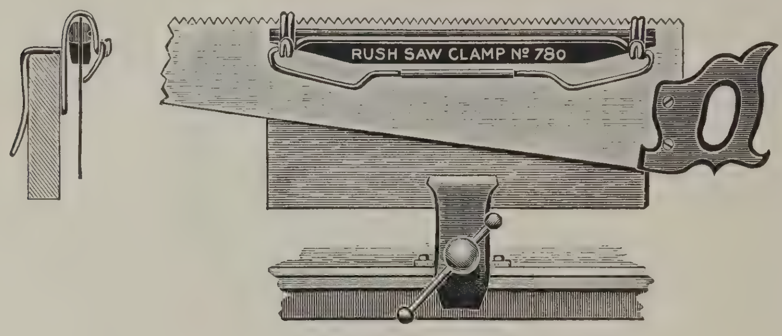
A number of novelties that have never before been shown are recent additions to the line of Smith & Hemenway Company, 110 Duane street, New York, who control the output of no fewer than eleven different American factories. In the way of carpenters' tools, the saw clamp and the mitre box herewith illustrated are notable. The "Rush" noiseless saw clamp takes its name from the fact that it is indeed noiseless because the jaws (15 inches in length) are made of wood, treated mechanically to prevent warping. But one movement of a hand saw is necessary in order to file the entire length. There are no screws or bolts to get loose and the frame, entirely of heavy spring wire, can be instantly adjusted to any ⅞-inch board. This is intended to be sold by the retail trade at 50 cents, or two shillings. The mitre box illustrated is unlike any other in that it goes on top of the work instead of receiving the work at the top of the box. This tool is light and compact, weighing but 2 pounds, can be folded and put into any tool chest and can be retailed profitably at $1.50, or 6 shillings, each.


WIRE CEILING HOOK.

Watch charms in the shape of miniature reproductions of tools or instruments peculiar to their trades are always popular among mechanics. A miniature telephone is 1 inch in height, supplied in either gold or nickel finish and retails at only 25 cents, or 1 shilling.

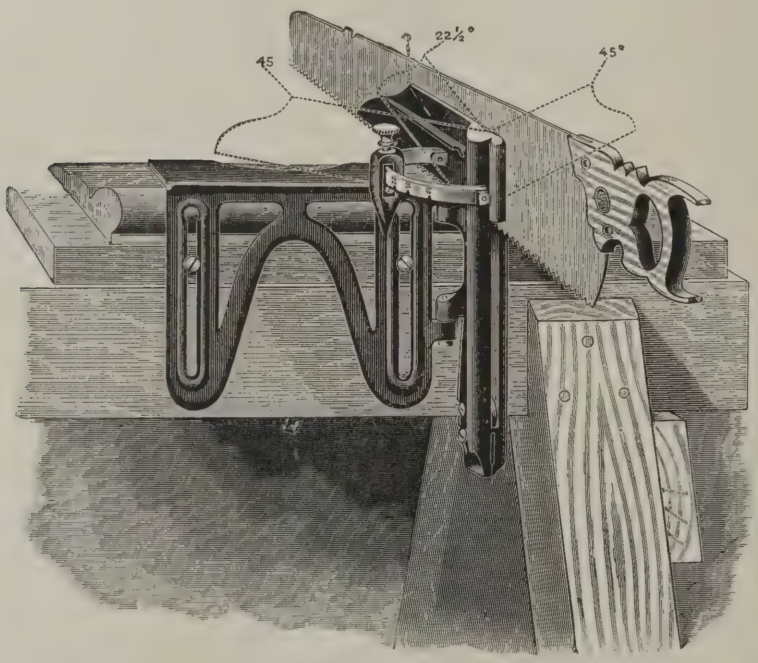
A miniature "monkey wrench" is a facsimile reproduction of the standard machinists' tool, 1½ inches in length, and is sold at the same popular price in spite of the fact that sixty-seven different operations are necessary in its manufacture.

Intended to be sold at the same low retail price of 25 cents, or 1 shilling, is a new combination lock, latch, hasp and staple, made entirely of pressed steel, with brass cylinder and two keys. At the same price again the new glass cutter which this house is offering will probably commend itself widely. The head of this cutter is of steel, the handle of rubberoid, holding six interchangeable wheels replaceable at will.



NEW SAW CLAMP.

A new compound lever hack saw frame is of heavy steel, adjustable by a lever on top, taking hack saw blades, either power or hand saw, from 8 to 12 inches in length. The retail merchant realizes a good profit in offering this frame at 50 cents or 2 shillings.



MITRE BOX.

The Abner Doble Company, engineers, of San Francisco, have appointed Mitsui & Co. to act as their sole agents in Japan and its territories, Korea, China and Manchuria, for the sale of Doble tangential water wheels and hydraulic apparatus.

IMPORTANT ELECTRICAL CONTRACTS.

According to the *New York Times* of April 29, the carrying out of the work involved in a number of important contracts recently secured by American manufacturers of electrical equipment will represent an outlay of more than $5,000,000. According to the same authority, the Czar's palace at Tsarskoe, near St. Petersburg, will hereafter be lighted by a complete plant now on order with an American concern, while the British Westinghouse Company, Limited, which represents the Westinghouse interests in Great Britain, and which is largely controlled by the American Westinghouse connection, has now on order more than 100,000 horse power of steam turbines and 40,000 horse power of generators on English account. The principal turbine orders have been obtained for London traction and lighting plants, while the generators are intended for installation in municipal power stations in the British metropolis, Bristol, Neasden, Middlesboro-on-Tees and Brighton.

The Italian affiliations of the Westinghouse people have contracted for turbo-generators for the Giovi lighting system, while the Australian engineering and contracting firm of Noyes Brothers, which represents the same interests in the antipodes, has ordered dynamos and motors for operating batteries, stone crushers and ore tramways in the New Moon Company's gold mines at Bendigo, New South Wales.

The Usina Electrica of Montevideo, South America, has ordered different apparatus for its new substations, while big gas engines of a new type are to be shipped to Buenos Ayres. Other orders for gas engines, which foot up a total of nearly 6,000 horse power, have been received from the Midland Railway Company of England, from Heysham Docks and from Gibraltar.

The London County Council has allotted the Westinghouse concern another contract for motor equipments for cars to be operated in and around the British metropolis, making an aggregate of thirty-four equipments ordered within the past few months. One thousand and forty magnetic brake outfits have also been requisitioned.

The United States Steel Products Export Company, the foreign business end of the United States Steel Corporation, which recently secured a contract for rails, etc., from the Glasgow corporation, received an order from the Manchester municipal tramway authorities for special rails.

Chas. S. Schieren, Jr., secretary of Charles A. Schieren & Co., of New York, sailed for Europe April 23, per S. S. Kronprinz Wilhelm, to visit his Hamburg office, and especially to assist in promoting the introduction in Europe of "Duxbak" waterproof leather belting, a new product of this firm's factories.

RECENT DEVELOPMENTS IN AMERICAN CONCRETE CONSTRUCTION PRACTICE.

It may safely be said that no other form of building material has ever sprung into prominence more quickly and taken firmer hold on the public favor than concrete. So rapid has been the increase in concrete construction in the United States within the last ten years, in every conceivable kind of building, that to supply the cement alone requires the united full capacity of over sixty of the largest manufacturing plants in America.

STONE CRUSHING PLANT.

In cities much of the heavy traffic is conducted through concrete tunnels. Telegraph and telephone wires are carried underground in concrete conduits. Sky-scraping buildings rest on pillars of concrete built up through caissons from bed rock, often 150 feet below the surface, and the structures themselves are frequently constructed almost entirely of concrete with the addition of small reinforcement bars of steel. For the building of large factories concrete is rapidly becoming one of the favorite materials. City, and especially suburban, houses are extensively built of concrete blocks, while in the construction of sidewalks and street paving the use of concrete is almost universal. In railroad construction work it is rapidly superseding other materials. Owing to its comparatively cheap first cost, and being practically indestructible, it is by many regarded as considerably less expensive even than wood. Shops, roundhouses and stations are built of concrete, even to the roofs. Bridges are now made almost entirely of this product, and where it is necessary to elevate tracks or roads the embankments are supported by retaining walls of concrete construction.

In rural districts, not only houses and barns are built of concrete, but stable floors, feeding floors, mangers, root-cellars, silos, in which green forage is stored for winter feeding, and even fence posts are made of this new construction.

Concrete in crude form, but producing fairly good results, was employed in the buildings of the Romans nearly 2,000 years ago, but the genesis of its modern use is of comparatively recent date. How quickly it has come into use in the United States will be most readily realized by showing how rapid has been the demand for increased production of cement.

There are many kinds of cement used in this country, but over three-fourths of the entire consumption is of the variety known as "Portland," taking its name from the limestone found on the island of Portland, England. This product was first manufactured by Joseph Aspden, of Leeds, in 1824, but its production in the United States dates only from 1872, and not until 1896 did the annual domestic production exceed the million-barrel mark. In 1904 the production had increased to 26,505,881 barrels, and is much greater at the present time, but the exact figures are not available. The entire production of cement of all kinds in the United States in 1892 was 8,758,621 barrels and it had increased in 1897 to only 10,989,463 barrels, while the estimated production for 1906 was 47,500,000 barrels, an increase of over four-fold in ten years.

The most approved composition of concrete for general construction consists of a mixture of broken limestone, granite or clean screened gravel, varying from one to two inches in diameter, clean, coarse sand and cement, in such proportions that the voids between the stone will be completely filled by the sand and the voids in the sand completely filled with cement, with a slight excess of cement to insure a perfect bond with the stone.

MIXING MACHINES.

To produce perfect concrete, every particle of sand and each piece of stone must be thoroughly coated with a film of cement, and this is only accomplished by thorough mixing. In the earlier uses of concrete machinery for mixing was not favored by contractors, partly because the machines then known did not have capacities as at present, and partly because the impression prevailed that the aggregates could be more rapidly and as thoroughly mixed by hand. With the growth of the indus-

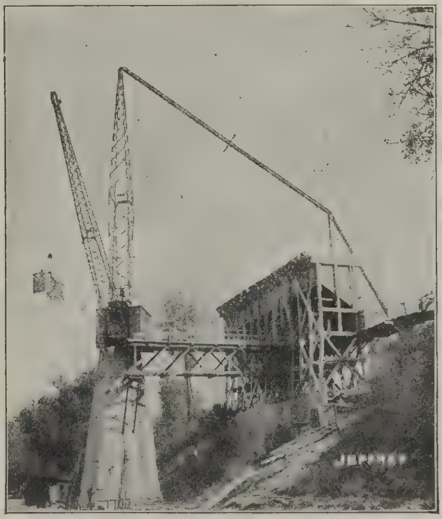


FIG. 1.

try, however, careful tests were instituted in many different laboratories, and it has repeatedly been demonstrated that concrete mixed by approved types of machines has a much higher tensile strength than that mixed with shovels by manual labor.

There are three general types of mixers used in the United States: gravity mixers, in which the aggregates are elevated to the top of a series of hoppers and pass through the several hoppers by the force of gravity and are mixed by their constantly changing relative positions in the descent; continuous mixers, to which the materials are fed continuously and are carried along through a trough or mixing recepacle by means of spirally arranged blades or deflectors; and batch mixers into which the aggregates are measured and are mixed either by the form of the mixing drum or by blades or scoops arranged around the interior circumference of the chamber, each batch being received, mixed and discharged before another is inserted.

When the stone, sand and cement are mixed together, with sufficient water added to dissolve the cement, the process of converting the entire mass back to stone begins immediately and it is therefore necessary to mix concrete rapidly. In the one to three minutes usually allowed to mix concrete, it has been found that when mixed by men with shovels, or in a gravity mixer, the aggregates are mixed together an average of about four times, when mixed in a continuous mixer the materials are mixed eight or ten times, but when mixed by the most improved types of batch mixers, the stone, sand and cement are thoroughly mixed about eighty times. There are over 50 styles of concrete mixers made in the United States.

Argument for "Batch" Mixing.

Manufacturers of gravity and continuous mixers make a point of the large quantity of concrete their machines will produce. This contention is met by makers of "batch" mixers with the claim that their machines will turn out concrete as rapidly as it can be placed in the forms by any ordinary force of men and the product is far superior to that made by the other types of machine. In this connection the Contractors' Supply and Equipment Company, to whom we are indebted for the foregoing interesting story of cement progress, write us as follows: "This fact is generally recognized by government engineers, who in making specifications for projects requiring a high grade of concrete, plainly say that a batch mixer must be used in mixing the concrete. The National Board of Fire Underwriters, in their proposed uniform building laws for all fireproof buildings in cities of the United States, recommend that 'all concrete for reinforced concrete construction, wherever used in such buildings, must be mixed in a machine which mixes one complete batch at a time and entirely discharges it before another is introduced.'" Our informants, the Contractors' Supply and Equipment Company of Chicago, Ill., while making this strong argument, also present an interesting and convincing description of the "Smith" batch mixer, whose sale they control and whose merits should be carefully investigated by prospective buyers of apparatus for this purpose.

The mixing drum of the "Smith" machine is made in double conical form, reinforced at the center, and having the gears and guiding frame arranged around the central axis. The material to be mixed is fed in at one end of the drum and when mixed is discharged from the other end by tilting while running at full speed. The arrangement of the blades in the interior of the drum is a noteworthy feature. The aggregates are not only lifted and poured vertically but the blades are so arranged that the materials are forced from end to end, and even when mixing the most adhesive materials there is a grinding, thorough mixing, action throughout the entire mass.

Among the advantages claimed for the "Smith" batch mixer is the fact that it will rapidly and perfectly mix anything required, while some other types of similar machines are very unsatisfactory with certain forms of plastic materials such as mortar, for example. Moreover machines of this sort, mixing and discharging by means of scoops, fail to obtain as perfect uniformity of the product, it is claimed, as is possible with the unlimited positive movement obtained throughout the entire mass by the arrangement of the interior blades in the "Smith" machine, besides involving loss of time.

We observe from the catalogue (Contractors' Supply and Equipment Company, Chicago) that this type of mixer is obtainable in no fewer than six sizes, having capacities of from 8½ to 46 cubic feet per batch. Mixers may be ordered either mounted on trucks or on skids, and may be equipped with steam, gasoline or electric power as preferred. Many labor-saving accessories are also described, among them a super-hopper for charging from elevated runways or an elevator for the same duty from level ground, automatic discharging devices and a special hoist for elevating concrete in the construction of high buildings.

Crushed Stone for Concrete.

The phenomenal growth of the use of concrete construction during the past two years has carried with it an equally augmented demand for finely crushed stone.

A few years ago the screenings or product of a stone crushing plant of a size of three-quarter inch, and less, was considered waste, while in a great many localities there is now the greatest demand for this size product. Finely crushed stone is required for many purposes for which it was formerly considered unsuited.

In order to meet the requirements of what may be regarded as practically a new industry, the supply of crushed stone in the volumes now required, improved types of rock-breaking machines have been perfected which range in size from capacities of four tons per hour up to the complete and immense plants typical of the new order of things. We note particularly improvements made in the well known "Gates" pattern of breaker manufactured by the Allis-Chalmers Company of Milwaukee, Wis., which has been particularly adapted to fine crushing for this purpose.

In the rebuilding of San Francisco, methods of economical leveling and construction have been sought out and practiced to a greater degree, probably, than at any other time and place in the world's history. As an instance typical of this, we may cite the work done on the Crocker Building, standing at the corner of Post and Market streets, where every avenue to waste, both of material and labor, has been most successfully closed through the exercise of a little ingenuity and forethought, aided by the best of modern crushing machinery.

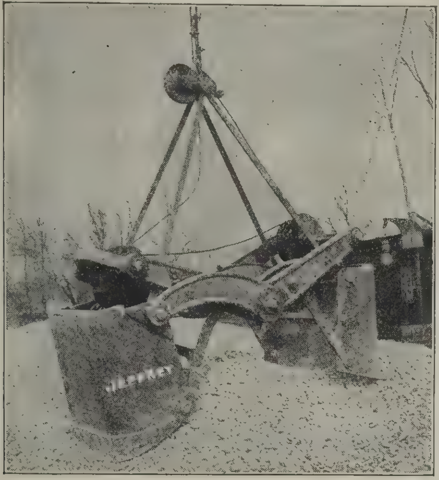


FIG. 2.

This structure, which is ten stories in height, with a frontage of about 200 feet, escaped any serious damage from the earthquake, but was gutted by fire.

The frame of the building being intact, nothing more was necessary than a reconstruction of its interior, and the contractors at once hit upon the profitable plan of utilizing for concrete mixture all bricks, tiling, stone work and flooring which had to be removed. Suitable apparatus was therefore installed, and as fast as the work of tearing down made this material available it went directly to an Allis-Chalmers "Gates" breaker, fed from bins supplied by chutes from various sections of the building. After being crushed to the desired fineness, the product of the breaker passed to a mixer, and as the concrete material issued from the latter it was taken by a system of elevators and conveyors to all parts of the building where needed.

The significant feature of this process lies in the fact that from the moment the material was taken from the walls and floors until the time it again became a part of the structure there was not the slightest break or loss in its handling. Economy could scarcely be carried further.

As an example of large installations, we reproduce herewith a general view of a large quarry, now approximately 200 feet deep, equipped throughout with Allis-Chalmers' machinery. Two sizes of "Gates" breakers are employed in each unit, with the usual elevating and conveying devices, and the revolving screens for separating the product of the crusher into the various sizes usually furnished commercially.

Crushed rock, especially in the finer sizes, is in great demand. Every convenience for handling has been devised. Beneath the bins, arrangement is made for delivering crushed rock direct to the cars by gravity chutes. Means are also provided for loading the product into wagons, more than a hundred teams being maintained by the company to haul to the customers readily reached in this manner. Ten or twelve railway cars can be accommodated at once on the tracks beneath the bins and may be filled in less than an hour.

HANDLING CRUSHED STONE IN BULK.

Cement makers using large quantities of broken stone and cement users requiring stone of smaller sizes are beginning to recognize the value of grab buckets as a means for handling broken stone and sand in a rapid and economic manner.

We illustrate a modern plant for handling large quantities of stone from barges to storage bins, from which it is spouted into railway cars as desired. This revolving derrick is of steel construction and is mounted upon a concrete pier, as shown. The mast is 92 feet high and the boom 75 feet long. Hoisting and slewing are accomplished by separate engines, the former being an 8-inch by 8-inch and the latter a 6-inch by 6-inch engine.

The rig is equipped with a grab bucket especially designed for handling material of this kind. Another illustration shows the bucket ready to take its bite; as will be noted, the span is very large, and the bucket is thus enabled to fill itself in even a shallow depth of material.

In still another illustration the bucket is shown closed, carrying its load to the storage bin. The manufacturers, the Jeffrey Manufacturing Company, of Columbus, Ohio, state that this bucket can unload a 1,000 ton barge in about ten hours and will handle in a satisfactory manner stone up to 4-inch cubes. Stones can also be handled from cars by means of this bucket, 90 per cent. being cleaned up without the least damage to the car, and no hand shoveling is necessary.

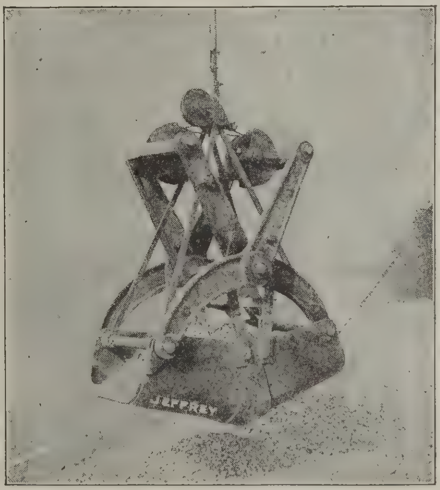


FIG. 3.

The bucket is of heavy design, to withstand the hard usage to which it is subjected. It is claimed that but little wear is apparent after a whole season's hard usage. Buckets may be had in any desired size, and rigs for handling them are designed, built and erected as users may instruct.

CONCRETE BLOCK MAKING.

The wonderful plastic qualities of concrete make it possible to produce any number of different effects and the finest of ornamental designs. One of the most extensive uses to which it is being put is in the making of building blocks, and the uses for these blocks cover the whole field of building. The concrete block industry has assumed very large proportions in the last few years, and machinery makers have very rapidly taken up the manufacture of molding machines of all styles and prices to meet the varied requirements of contractors and builders.

One of the simplest and hence one of the most popular and successful machines for producing hollow concrete building blocks is illustrated herewith. The manufacturers of this machine (Van Smyth-Manley Construction Company, of New York) state that it is unusually strong and substantially built and has exceptionally few working parts.

The machine in operation has but five parts and these are strongly hinged together. There are no springs, cogs, levers or other parts to get filled with sand or to break. It is easy of operation, and is capable of making an almost endless variety of blocks. An important feature is that the blocks are tamped face down, the advantage of which is well known to cement users. Each block is made on the ground and is left where made until cured. The machine is lifted from the block instead of moving the block from the machine. The man using the tamper works in a natural position with less fatigue and with a more powerful blow than when working on a bench or frame, insuring a more dense, compact and stronger block.

The machine produces perfect imitation of stone, smooth or rough face. It is equipped with twenty-eight interchangeable parts, capable of making hollow or solid blocks from 4 to 24 inches long, 8, 10 or 12 inches in height and width; eight styles of stone facings and eight facings to match for corner blocks; triangle blocks to fit in gable and under eaves of roofs of any pitch; 24-inch (or less) corner blocks with 8, 10 or 12 inch return; also bay window blocks with any length or degree of return angle; square pilaster or porch column blocks; chimney blocks, one or two flues; coping blocks with gable roof shaped top for fences, façades or top of walls. This entire equipment is furnished with each machine.

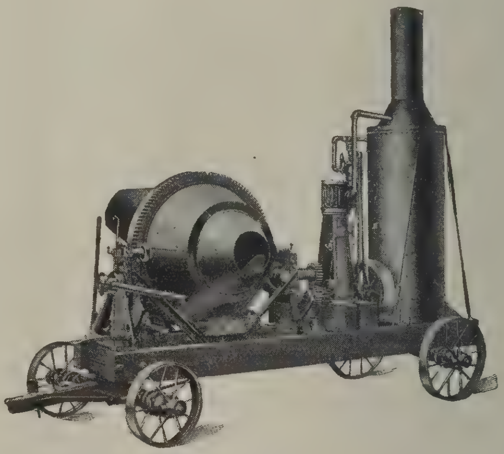
In interior countries where cement is difficult to obtain, hydrated lime (air slaked) may be used in larger quantities than given in the formulas as a substitute for cement.

The Van Smyth-Manley Construction Company (New York) advise us that they are agreeable to making arrangements with foreign houses to manufacture these machines on royalty, for which purpose complete sets of patterns will be furnished. Apart from that, however, machines are offered for export on exceedingly liberal terms.

CEMENT BRICK MACHINES.

The Cement Machinery Company, of Jackson, Mich., manufacturers of concrete block, brick, post and mixing machinery, have lately placed on the market two more sizes of their "Favorite" mechanically tamping sand-cement brick machines, especially designed for the use of small manufacturers.

The larger cement brick plants, where 6,000 or more brick are wanted a day, have been installing the company's twenty-brick machine. Plants wanting 3,000 brick a day have used the ten-brick machine. There is a large class of users, however, who do not wish to go into the extensive manufacture of cement brick, but desire the machine for making a few stock brick, and more especially for making the large assortment of ornamental designs that can be made with the "Favorite" machine; consequently the demand has been very great for machines of smaller size, namely, for making five brick or two brick, and to meet this demand the company has placed on the market its two smaller machines of these capacities. All of the ornamental designs are interchangeable with these smaller machines in the same way as with the larger ones, and the same quality and style of work can be done, although, of course, not so many brick can be made in a day.



BATCH MIXER MOUNTED ON TRUCK.

Another novelty now being placed on the market by the same manufacturers (Cement Machinery Company) is an adjustable mold for making sills, caps and steps or other solid concrete products. This mold has a very wide range of work, being adjustable from 72 inches down to 12 inches in length and from 5 inches to 14 inches in width, 8 inches high.

CONCRETE INSTANCES.

The Century Cement Machine Company, of Rochester, N. Y., makers of the "Hercules" concrete block machines, report that they are having a large demand for their products in foreign countries. Recently a shipment of "Hercules" machines, aggregating in weight over 18 tons, was sent to Egypt. The same week three machines were shipped to Ireland and two to Porto Rico.

The Ideal Concrete Machinery Company, of South Bend, Ind., has dispatched one of its factory experts, Mr. George A. Ayrault, to Europe, where he will demonstrate the capabilities of a large shipment of "Ideal" machines recently sent to Bucharest, and will afterward proceed to Budapest to perform the same duty for a consignment to the Hungarian Government. The Glasgow agent of the same company, Mr. Matthew Wylie, is now making a special visit to the factory.

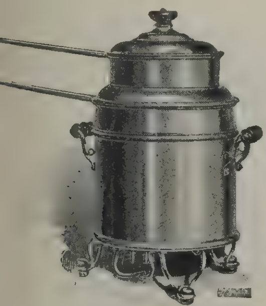
The Hoosier Manufacturing Company, of Auburn, Ind.; the Concrete Block Machine Company, of Auburn, Ind., and the Normandin Machine Company, of Jackson, Mich., have all joined hands and consolidated their entire interests with the Cement Machinery Company, of Jackson, Mich., which name will style the above consolidation in the future.

The Cement Machinery Company will now control one of the largest lines of concrete machinery in the world, namely, the Hoosier, Peninsula and Champion face-down machines, the Normandin model and Cemaco side-face block machines, the Favorite mechanical tamping 10 or 20 pocket cement brick machines, the practical adjustable sill, cap and step mold, the Universal cement post machines, concrete mixers, cement sewer pipe molds, ornamental ball, base baluster and column molds, cement shingle machines, cement roofing tile machines, etc.

This company will now make a specialty of installing complete concrete product plants throughout the United States and foreign countries. Its export offices are located at 29 Broadway, New York City.

THE APPLICATION OF ELECTRICITY TO HOUSEHOLD USES.

Central station managers throughout the United States are devoting the greater part of their attention nowadays to increasing the sales of the electric current in their cities, villages and districts. Schemes without number are to be noted, backed by the liberal use of printer's ink, exhaustive campaigns of personal correspondence and dazzling displays of electric sign boards. Several periodicals even have sprung into existence, devoting themselves exclusively to new methods of getting business for the electric current that the central station man has to sell. Quite apart from the effort to introduce the electric light more generally, the electric companies are carrying on campaigns in every field susceptible of development. By way of illustration, an advertisement may be cited that has been used by more than one company. In part this advertisement reads: "Let Electricity Talk for you (the electric sign)—Climb for you (the electric elevator)—Carry you (the electric automobile)—Cook for you (all kinds of cooking apparatus)—Do your laundry work (the electric flatiron)—Cool and warm you (electric fan and grate)—Light your way (in the house, on the porch)." Here are indicated some of the directions in which central station managers are working to secure more business and pay larger dividends, and the extension of their efforts and variety of their interests means more often than not the creation of special "New Business" departments calling for the exercise of ingenuity and ability of no mean order.



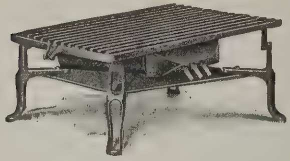
COMBINATION LIQUID HEATER.

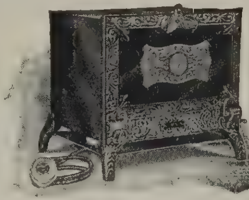
ELECTRIC TEA KETTLES.

COMPLETE ELECTRICAL COOKING OUTFIT.

It may be doubted whether the development and the common use of electric household utensils has elsewhere reached the proportions that are now general in the United States. And this is a field which American electrical companies are devoting themselves especially to exploit. For example, electric flatirons are frequently introduced by offering them to a carefully selected list of possible customers on thirty days' free trial. Recently, in a small community, thirty-seven irons were so placed and only two of them were returned. Flatirons are chiefly used during the day, are sold (in the 6 pound size) at about $3 each and are said to return an income of from $3 to $9 per year. In another and larger city, 1,000 letters were sent to residence customers of the electric company, resulting in placing 200 flatirons in two months' time.

In addition to equipping demonstration departments and show rooms in the most thorough manner imaginable, it is thought very desirable to give the public a practical object lesson in the advantages offered, and for this purpose rooms are installed in large and prominent shops, or the home of the manager or superintendent of the lighting company is fitted with large capacity circuits for heat and power, and a complete assortment of small motors for sewing and washing machines, etc., besides irons, stoves, fans, chafing dishes, radiators, water heaters and the score of other devices now on the market, ranging from soldering irons to massage "vibrators," hair curlers, and hair driers. For the illustrations accompanying this article, which represent a variety of heating devices now being extensively used, we are indebted to the courtesy of the General Electric Company, of Schenectady, N. Y.


BROILER.


ELECTRIC OVEN.

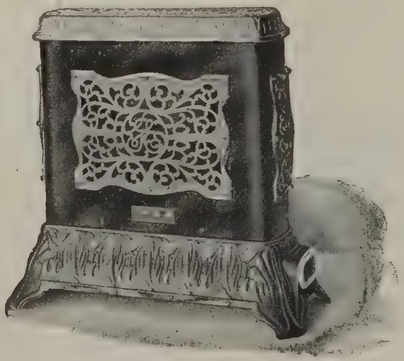
DISK STOVE.

The great advantage in heating and cooking without coal, gas or oil, the immense convenience in being able to turn the heat on or off with a switch like an incandescent lamp, and the fact that if the electric current costs a little more than has formerly been paid for coal or gas such expense is more than offset by the comfort derived from pure air and increased coolness during hot weather, have all combined to encourage enthusiastic inventors in the development of practical electric appliances for everyday use. The experimental phase has been passed and reliable as well as serviceable devices are now to be had, taking the place and filling the offices of all ordinary household utensils. The popular demand for electric heating and cooking has reached a point where it is thought necessary to have separate "heating circuits" for the satisfactory installation of the apparatus. The advantage of such a circuit over an increase in current carrying capacity of the lighting circuits is that it permits the use of a separate meter, with a special rate of charges for heating or cooking service as well as for such household power purposes as motors for sewing machines, washing machines, churns, coffee grinders and meat choppers, fans, etc. Few houses are now built without wiring for electric light, and it is but an insignificant step to include also special provision for the future introduction of cooking and heating apparatus, a step which electric companies are urging because of the profit resulting to them in making a two-rate schedule of prices, encouraging their day load by low rates for the service mentioned.

BREAKFAST SET—CHAFING DISH, PERCOLATOR AND TOASTER.

With the exception of heaters, radiators and some special devices, two distinct forms of heating elements are used in the General Electric Company's cooking and heating apparatus. The so-called "cartridge unit," employed in flatirons, ovens, etc., consists of a thin tape of special resistance metal about ⅛-inch wide, wound edgewise into a small hollow cylinder. The "quartz enamel units," with which chafing dishes, frying pans and liquid heaters are equipped, use round resistance wire wound in

ELECTRIC GLUE POT.


NON-LUMINOUS AIR HEATER.

LUMINOUS RADIATOR.

a coil of small diameter and then formed into a flat spiral. The disc thus made is held against a layer of quartz grains imbedded in enamel directly on the bottom of the heater. Both types are readily replaced if damaged by accidents. The various forms of apparatus which are here illustrated require no special comment, with the possible exception of the electric heating pad. This is made of fine resistance wire, woven into flexible asbestos carefully insulated and covered with felt. These pads maintain any one of three degrees of heat indefinitely and their advantage over hot water bags in convenience, perfect control of temperature and absence of liquid to leak out, commend them both in the home and in the hospital.

ELECTRIC FRYING PANS.

The "cereal cooker" is really a combination utensil and may be used with its double boiler for cooking cereals or steaming vegetables, or with the inner dish removed, for boiling eggs, heating water for shaving, or milk for the baby and for half a dozen useful purposes. Electric luminous radiators and non-luminous air heaters are made in a variety of attractive designs, give quick heat, but consume no oxygen and give off no gases. They are especially desirable in temperate zones during spring and autumn or in sub-tropical countries during their mild winters. Electric glue pots are but one form of appliances of this class that are fast being multiplied for shop and factory use.

SHOW WINDOWS.

Shopkeepers in the United States and in Canada are accustomed to claim that in the attractiveness of their show windows they easily far outstrip their brother traders in any other part of the world. That this is not mere empty boasting will be generously acknowledged by most impartial travelers of no matter what nationality. The attention bestowed throughout the United States on the construction and the artistic arrangement of show windows and window displays has undeniably resulted in the development in this country of an art or a profession which is almost without a counterpart in other lands. Every large retail establishment employs at least one and often a whole corps of trained "window dressers," who have often taken courses of instruction in the business at schools established for the purpose, and whose efforts not only delight the eye but are usually regarded both as profitable advertising and as an indispensable adjunct to a successful retail business. But before the arrangement of decorations and displays in a show window can be attempted there arises the primary question of the construction of the window itself. Light and as much of it as possible is essential. Airiness, the impression of space, must be obtained in one way or another. Hence pillars, posts, heavy and cumbersome corners are to be avoided. To meet these necessities of modern and progressive retail merchants there has arisen a new and unique manufacturing industry which is called "store front construction." When a new American "store"—*i. e.,* shop— is built the show windows are invariably constructed in accordance with the exigencies of modern display as already explained; but it is also possible, as it is becoming the rapidly growing practice, to entirely remodel the fronts and the show windows of older buildings dating from before the development of our present practice in regard to this extremely valuable form of advertising. What is known as the Petz store front construction is one of the most widely used systems, as it was a pioneer in the industry. The materials for this system of construction are built by the Detroit Show Case Company, Detroit, Mich., by whose president and superintendent, Mr. John Petz, it was invented and perfected. The growth and the extent of the business may be judged from the fact that, although originally a side line, developed in the principle of and alongside of the line of counter and show cases made by this concern, the demand has within the past two years necessitated the construction of a special factory devoted solely to this equipment. The materials necessary consist only of corner posts and transom bars. These are built up over an inner core of cypress wood reinforced with a heavy steel bar extending its full length, and outside of all is a heavy metal covering finished in copper, brass, bronze, gunmetal, German silver or nickel plate. This construction positively insures great strength, stiffness and rigidity. It takes up incredibly small space, does not obstruct the light, permits the use of every inch of the window for display, and will yet support awnings without undue strain. Another most important feature claimed for this system is the advantage gained by setting the glass from the outside. A show window may not be broken in a year, but when such an action does happen the necessity for quick and easy action is apparent.

The following table from the *Wall Street Journal* shows a comparison of the population, total number of telephones and telephones per 100 of population on January 1, 1907, of New York City and the principal European cities:

City.	Population.	Telephones.	Telephones per 100 of Population.
London	6,580,616	130,101	1.98
Paris	2,660,559	62,370	2.34
Berlin	1,888,848	83,824	4.43
Vienna	1,674,957	27,230	1.63
New York.......	3,437,202	279,047	8.12

Experiments recently conducted by experts of the Department of Agriculture at Washington seem to demonstrate that the camphor tree can be grown successfully in the State of Florida. Thirty pounds of camphor gum produced by some of these trees were refined and proved to be in every respect a perfect substitute for the Oriental article.

HORSELESS VEHICLES FOR HORSELESS AREAS.

In a lecture delivered before the National Geographic Society at Washington, D. C., April 12, Mr. O. P. Austin, Chief of the Bureau of Statistics of the Department of Commerce and Labor, advanced a strong and logical argument for the rapid extension of the use of motors and particularly motor freight carriers.

The dependence of the tropics and the Orient upon these crude methods of transportation for their products—a dependence due to the absence of that animal which has so aided in developing the temperate zones, the horse—is, in Mr. Austin's opinion, one of the primary causes of the slow development of the tropics, where the horse cannot thrive because of climatic conditions, and of the Orient, where land cannot, owing to the density of population, be spared for production of food for his sustenance.

This problem of the development of the tropics and the Orient, which had been so long delayed by reason, in part at least, of the absence of the horse for transportation between the point of production and the common carrier, might now, in Mr. Austin's opinion, be solved by the substitution of the horseless freight carrier of the automobile type for the crude methods which have prevailed in those sections of the world in which the horse is not available.

Of the approximately 100,000,000 horses known to exist in the world, he said, 80,000,000, or four-fifths of the entire number, are found in the temperate zone, and nearly all among Occidental people; while the remaining 20,000,000, scattered through the tropics, are largely employed in the service of temperate zone visitors or residents, and are but feeble representatives of that noble animal as he is known to the people of Europe or America. In the United States and Canada we have approximately 1 horse for every 3½ persons; in South America, 1 for every 7; in Mexico, 1 for every 12; in Japan, 1 for every 33; in Turkey, 1 for every 40; in the Philippine Islands, 1 for every 50; in Africa, 1 for every 150; in India, 1 for every 200, while in southern China, for which no statistics are available, the number is probably even less in proportion to population than in Africa or India. The comparative absence of the horse in the tropics is due chiefly to climatic conditions, and in the temperate zone Orient to the fact that the density of population prohibits the utilization of land for the production of his food. In his place we have, therefore, scattered through the tropical countries of the world approximately 3,000,000 camels, 10,000,000 donkeys and 20,000,000 buffaloes or caribou; while everywhere that horses are not available the patient ox, whether of the type known to us or the humped variety of the Orient, is the substitute. With the scarcity of animal power in the tropics and the Orient man has devised many methods for travel and transportation, and in many cases has perforce put his own shoulder to the wheel or his own neck under the yoke and made himself a burden bearer and the transporter of not only merchandise but in some cases of his fellow man. No one who has visited the tropics and the Orient can fail to realize the great disadvantage under which tropical and Oriental man has labored in his attempts to develop intercommunication and exchange of products, and the great benefits to him and to science and to commerce which would come from a satisfactory device which would do for the tropics and the Orient what the horse has done for the temperate zone and the Occident.

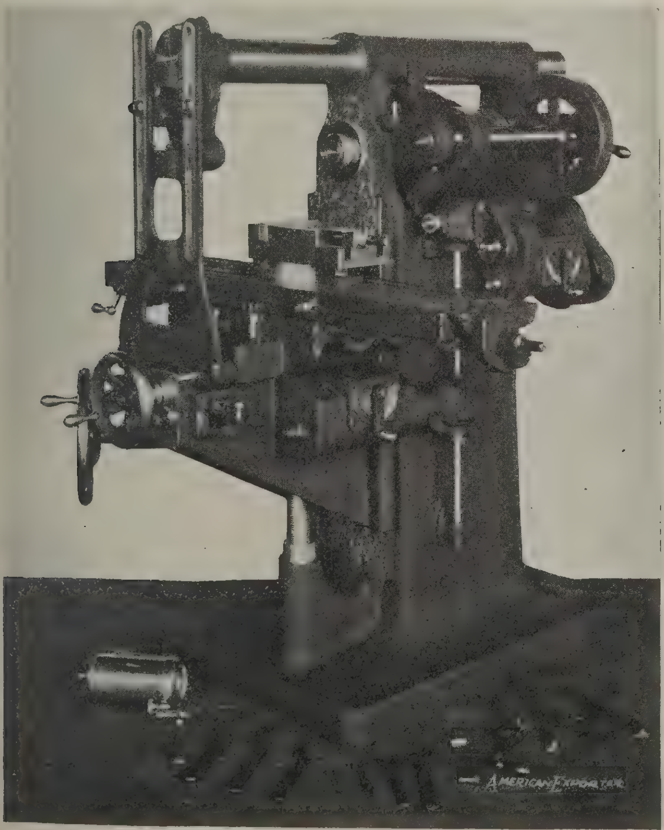
The possibility and practicability of applying the self-propelling vehicle to the transportation of merchandise and people in deserts, in the tropics and the Orient has already suggested itself, and the experiments made have already assured success. In the deserts of New Mexico and Arizona motors are successfully carrying freights in a temperature of from 120 to 140 in the sun, where, owing to the extreme heat, horses or mules can only be used at night. In Nevada motor trucks are now performing the work of 30 horses each, carrying freights over 100 miles of mountain roads. In California motor cars are carrying over dirt roads in the mountain regions as much ore at each trip as would require 100 pack horses for its transportation. In Porto Rico a line of three motor vehicles, established by an enterprising American to carry passengers and mails, performed the work for which more than a score of vehicles and over 100 horses had been required. Numbers of American motor vehicles for carrying heavy loads of passengers have been put on the roads of Cuba and Santo Domingo with success, and more are being ordered. In Honduras American motor trucks are conveying minerals to the seaboard from the mines 100 miles inland, a single motor performing in one day as much work as could be accomplished by 100 mules in the same time. In South America the horseless vehicle is carrying passengers and freights to the inland cities over roads where only the donkey was utilized, and doing so at an enormous saving of time and expense. United States Consul Michael reports that the Indian Government is considering the desirability of utilizing motor transport wagons for moving the products of the out-of-the-way districts to market. Special Agent Crist reports to the Department of Commerce and Labor a rapidly increasing use of the horseless vehicle in South Africa, especially in the mining regions; that nearly a million dollars' worth of these vehicles were imported in 1906, and that the cost of constructing motor roads is only about one-eighth as much as that of railways. In the Congo the Belgian Government is constructing hundreds of miles of roads for the use of the motor, which is to be applied to the transportation of freight in that section. In Japan the experiments with the horseless vehicles have been so successful that a company has recently been organized in that country, with a capital of 10,000,000 yen, for the purpose of building and operating vehicles for a general transportation service in Tokyo and thence to the surrounding towns.

MODERN TYPES OF PLAIN MILLING MACHINES.

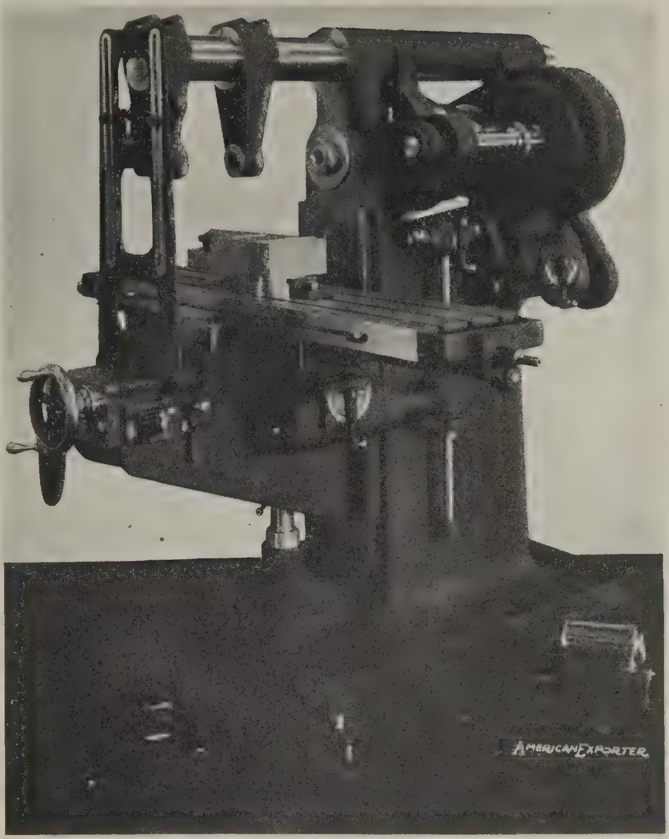
In the accompanying illustrations are shown two styles of plain milling machines which are said to represent the acme of milling machine design and to embody everything that modern practice has shown to be essential to the production of work. Both have already met with a large demand abroad and their merits are generally recognized by users of this class of machines. Their utility is unlimited and their manufacturers claim that they "embody every desirable convenience that modern milling practice demands."

One of the important features is the positive gear and change feed mechanism, by which thirty-two changes of feed can be made without stopping the machine. The table has double bearing surfaces, which allows it to work freely, even when at the extreme end, and also tends to keep it in perfect alignment. Steel gears are used throughout the machine and the overhanging arm is of solid steel. The spindle, which is made of crucible steel, has an 11-16 inch hole through its entire length, and runs in phosphor bronze boxes arranged to compensate for wear.

The thirty-two changes of feed are provided with positive and automatic stops. The changes are all within easy reach of the operator and can be engaged or disengaged while the machine is in motion without the slightest injury to the working parts. The bearings and wearing surfaces are exceedingly large; the spindles are strongly back-geared, and all parts are designed with special regard for the stress, wear, and their relation one to another.



NO. 2-B. PLAIN MILLER.



NO. 3-B. PLAIN MILLING MACHINE.

These machines are styled by the manufacturers, the Owen Machine Tool Co., of Springfield, Ohio, their No. 2-B and No. 3-B millers. The former has a transverse movement of 7½ inches, a vertical movement of 19½ inches, and a longitudinal movement of 28 inches. The transverse, vertical and longitudinal movements of the No. 3 machine are 11 inches, 20¾ inches and 38 inches respectively. The table of this machine has a working surface of 50 by 12½ inches, and that of the No. 2 miller a working surface of 41¼ by 10 inches. The equipment which goes with these machines includes everything shown in the cuts, together with overhead works.

Considerably more than one-half of the world's sugar is now produced from beets. The percentage which beets supplied of the world's sugar product was in 1840 but 4.3 per cent.; in 1850, 14.3 per cent.; in 1860, 20.4 per cent.; in 1870, 34.4 per cent.; in 1880, 43.1 per cent., and in 1890, 63.7 per cent., while 1900 showed for beets the highest proportion in the world's production of sugar—67.7 per cent. Of the United States production, aggregating approximately 1,300,000,000 pounds, a little over one-half was produced from beets, the year 1906 having been the first in the history of the country in which the domestic production of beet sugar exceeded that produced from cane, the figures of 1906, as supplied by the Bureau of Statistics, being: Beet sugar, 673,000,000, and cane sugar, 600,000,000.

NEW ABRASIVE POLISHING WHEEL.

The wheel shown herewith is a new departure in the polishing line, and while it has been on the market but a short time it already has demonstrated its superiority and has been adopted by many of the largest manufacturers in the country. It is made of a special abrasive compound, said to be entirely different from anything used in the polishing line. It is made of part rubber and other ingredients that act as a binder, and with this is mixed either emery, carborundum, carbonite or corundum, in grains running from Nos. 20 to 180. It is vulcanized under hydraulic steam pressure.

For polishing, these wheels are very economical and long-lived, and dispense with the annoyance of renewing leather-faced wheels, or recovering with emery cloth. The manufacturers, the Springfield Tire and Rubber Company, Springfield, Ohio, make them in a great many ways to meet the requirements of every kind of metal and all polishers.

They are especially adapted for polishing cutlery, edge tools, plow mould board, machinery and engines, and metal of all kinds, without in any way marring or scratching the surface. When the cutting surface on the face of the wheels becomes filled with particles of metal it is easily renewed by holding a wet sponge or cloth on the face while the wheel is in motion. This can be done either dry or with water, but no oil should be used. The practicability, high efficiency and lasting qualities of these wheels are the features that are winning for them rapidly increasing favor among users of these devices. In this country they are used in large quantities, and a foreign demand has also been created which bids fair to make them equally well known abroad.

POLISHING WHEEL.

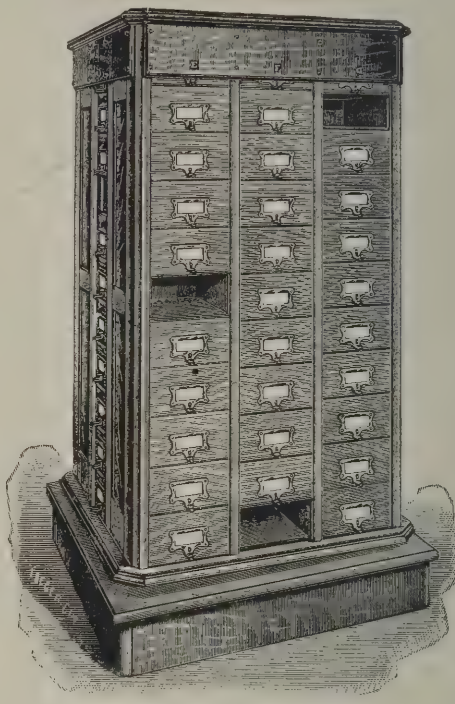
One of the largest and most important water wheel contracts of the year has just been awarded to the Dayton Globe Iron Works Company, Dayton, Ohio. The contract is with the Aluminum Company of America, for its plant at Massena, N. Y., which was formerly owned by the St. Lawrence River Power Company. It includes twenty-four turbines, which when installed will develop twenty-four thousand horse power.

The shipment will aggregate 750 tons or in the neighborhood of sixty carloads. The work is to be shipped from July to October of this year, and will be installed in the place of another type of turbine which has failed to meet the up-to-date requirements of electrical transmission.

At the recent International Exhibition held in Liege, Belgium, the Armstrong Brothers Tool Company of Chicago, Ill., was awarded a medal for its exhibit of lathe and planer tool holders. This concern is one of the largest producers of these tools, and its products are equally well known and almost as extensively used abroad as at home.

CATALOGUE FILING.

One of the most perplexing problems that confront the merchant or importer is the convenient and accessible filing and classification of the manufacturer's or supplier's catalogues, which are indispensable to the conduct of his business. A new device for this purpose has recently been put on the market by the American Bolt & Screw Case Company, of Dayton, Ohio. This concern also manufactures a line of revolving cabinets for the use of ironmongers, intended to hold supplies of bolts, screws, repair parts, etc., and the new catalogue cabinet which they are putting out includes the good features of their older apparatus suitably modified for catalogue use. As will be seen from the accompanying illustration, this revolving cabinet occupies small space and is readily accessible in every part. Eight or ten different stock sizes are listed in the manufacturer's price list, containing varying numbers of pigeonholes of standard catalogue size, but special sizes may be built on order. The fronts of the pigeonholes in the revolving part are placed in grooves and slide up and down, held in place by an ingenious device while in use. These cabinets are dustproof, substantially constructed of chestnut, finished handsomely in several different styles, and are provided with index cards, enabling one easily to find any desired catalogue.

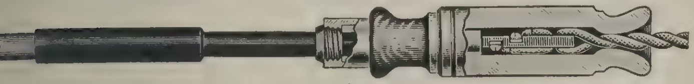


FILING CABINET.

The arrangements made by the New South Wales Government for the purchase of rabbit proof fencing wire for resale to farmers on the time payment system are proving lamentably inadequate, and both wholesale and retail dealers are continually being asked for supplies. There is a ready market for several hundred miles of suitable fencing. Stocks are very low, however.

ELECTRIC SOLDERING TOOL.

A device new to foreign trade, though widely known in this country, is shown in the illustration on this page. This is an instrument designed especially for telephone switchboard use and other light, rapid soldering. It has proved to be thoroughly practical, is light and rigid in construction, conveniently arranged, and economical in operation. These features, combined with its high efficiency and durability, have won for it widespread favor and it has been adopted for general use by most of the telephone companies in the United States, and is now being introduced in Europe through the offices of the Western Electric Company.



SOLDERING TOOL.

It provides ample heat at the tip with minimum current consumption and has a very convenient arrangement of the handle and terminals. It is claimed by its manufacturers (Vulcan Electrical Heating Company, of Chicago, Ill.) to be superior to the gas heated tool in economy, convenience and reliability. The instrument is built along lines of such simplicity that it is practically impossible for it to get out of order.

SUCCESSFUL AIR DRYING.

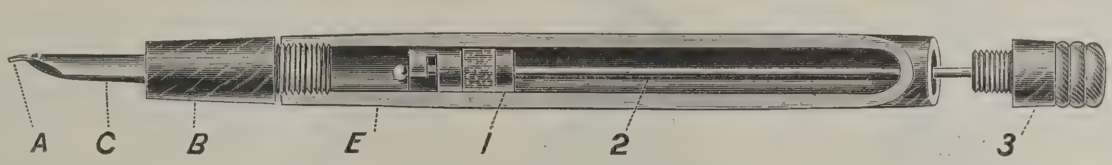
There is an element in successful air drying which is of the highest importance, but which is apt to be totally neglected by those not conversant with the principles of the subject. This is the velocity with which the air passes over the surface of the material. Experiment shows that the rate of transmission of heat communicated to a surface by a gas passing over it varies with the square root of the velocity, so that the higher the velocity the more rapidly will the evaporation take place. This effect is probably similar in some respects to scour on the beds of streams, though the equations in the two cases are unlike. The actual velocity is limited, on the other hand, by the fact that the power varies with the cube of the velocity; so that there will be found a certain velocity of maximum efficiency where these two elements balance. In the designing of the drying-room care should be taken that the proper volume of air not only passes through, but that it passes over the surface of the material at the most economical velocity; which necessitates in turn that the empty space in the drying-room or chamber shall not be too great.

LATEST SELF-FILLING FOUNTAIN PEN.

No form of writing instrument enjoys greater popularity than the fountain pen, and the reason for this is very clear when one considers the many advantageous features this style of pen embodies. The favor accorded the fountain pen extends to every country in the universe, and the demand for it is a largely increasing one. An illustration of one of the most perfected types of self-filling fountain pens is shown herewith. In principle it is different from other pens of this class, due to the fact that it dispenses with the use of the soft rubber sack found in the average fountain pen.

The construction shows a piston of sterling silver, with its head hard rubber and cork. There are no parts of the pen to break down or wear out through use. The pen itself works like an ordinary syringe; by simply withdrawing the piston the entire reservoir space becomes filled, and with even more ink than can be put in a regular fountain with a filler. If through any accident the self-filling mechanism should be disabled, the point section of the pen can be unscrewed and the fountain used as an ordinary fountain pen.

Every part of this pen is made in the factory of the manufacturer, Paul E. Wirt, of Bloomsburg, Pa., who has been engaged in the manufacture of fountain pens for twenty-eight years. This long experience in developing and perfecting writing instruments has enabled the inventor to produce a fountain pen that for simplicity, durability and service could hardly be surpassed. A sectional view is given here of the manufacturer's latest product, known as Model No. 100. A study of the cut will clearly show the improved features embodied in this instrument, and the following description shows the simple and easy method of filling: Unscrew rod-head "3," withdraw full length and turn rod "2" around until engaged with piston or suction-head "1." Place the gold pen in ink full depth to nozzle; force in the suction-head as far as it will go, and in withdrawing same the reservoir will become filled. Invert fountain, release suction-head by one-half turn of rod-head "3," and push same in full length and screw tight to place.



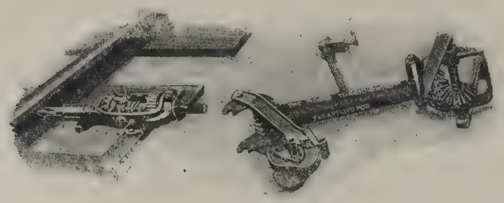
SELF-FILLING FOUNTAIN PEN—SECTIONAL VIEW.

The manufacturer also makes the rubber sack type, in order to supply the requirements of those who have calls for this particular class of pen.

The DuBois Iron Works, DuBois, Pa., has aborbed the entire business of the Lazier Engine Manufacturing Company, of Buffalo, N. Y., and in the future the business will be conducted with headquarters at DuBois, the Buffalo office being maintained as a branch.

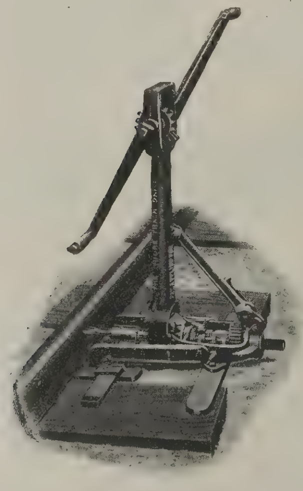
SERVICEABLE TRACK DRILL.

To meet the requirements of railroads and others using similar devices, a new style of rail drill, adapted for heavy and severe work, was placed upon the market a short time ago, and it has proved highly efficient in fulfilling the demands made upon it. It was especially designed for use in yards and on busy roads, as its construction and operation are such that traffic can be carried on without interruption. It can be placed between the rails, the upright and cranks immediately detached, leaving the lower parts lying below the top of the rail to allow trains to pass, then attached and work resumed with very slight delay. Three views are given here, showing, respectively, the over-clutch attachment, the under-clutch attachment, and the over-clutch dismantled.

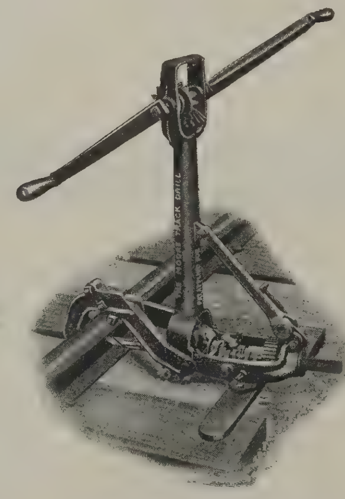


OVER-CLUTCH WITH UPPER PARTS DETACHED FOR PASSING TRAINS.

The detaching of the upper parts of the over-clutch is done easily and quickly, making it a feature to be appreciated by track men. The under-clutch is also a new and superior feature; it can be attached to the rail very quickly without any digging under the rail. The drill has a variable feed which can be adjusted from nothing to the full capacity of the drill; that is, to meet any requirement, large or small drill, hard or soft rail, reaming for electric bond work, etc. By throwing the feed mechanism out of gear the drill bit can be quickly fed up to or returned from the work.



UNDER-CLUTCH ATTACHMENT.



OVER-CLUTCH ATTACHMENT.

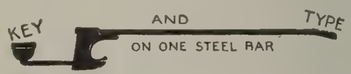
Ball thrust bearings are used on the spindle instead of friction washers, as ordinarily used in most drills for the same purpose, thus reducing friction to a minimum. The drill is made by the Kalamazoo Railway Supply Company, of Kalamazoo, Mich., and it comes in two sizes, known as No. 1 and No. 2. The former weighs 60 pounds and was designed for drilling holes 1 inch and smaller, but has sufficient power to drill holes 1⅛ and 1¼ inches. The No. 2 size weighs 100 pounds and is recommended for continuous heavy work; it will easily drill holes 1⅛ and 1¼ inches.

ADVANCEMENT IN TYPEWRITER CONSTRUCTION.

The machine illustrated herewith has several features which make it distinctly different from the general run of typewriters now in use. Besides being simple in construction, strong and durable, it is said to have the fewest parts of any similar machine now in use, and owing to its compactness and weight of only eleven pounds it is easily portable, and has proven a favorite with secretaries and traveling men and for home use.

NEW MODEL OF VISIBLE TYPEWRITER.

One of the unique features of this machine is the construction of the type bar, which consists of a single steel bar, instead of a combination of joints and bearings, as is the case with many of the machines now in use. The importance of this feature is obvious, since this construction renders it practically impossible for it to get out of order, and the operator is always sure of having his work in perfect alignment. This one-piece bar feature is the adaptation of the simple lever principle to typewriter construction, and is considered one of the most important recent inventions in the typewriter field. The carriage is light and moves smoothly on ball bearings, which, with wheel escapement, together with the direct-acting type bar, allows skillful operators to maintain their highest speed with the minimum of physical effort. The wheel escapement releases the ball-bearing carriage with unvarying precision, and at the same time prevents any possibility of jumping or skipping spaces. The direct action of the type bar gives high manifolding capacity, as every ounce of the effort put into the keys is transmitted without loss of power direct to the type, and the alignment is perfect in both original and manifold copies.



ONE PIECE TYPE BAR.

as each bar travels through a separate channel to the type guide directly under the printing point.

The machine has the standard universal keyboard, with shift keys for capitals and figures; takes paper 9¾ inches wide and writes a 7-inch line. The simple construction of the typewriter makes its mechanism readily understood. All parts are interchangeable, being made to standard gauges. This machine is known as the "American No. 7," and is the latest model put out by the American Typewriter Company of New York, whose various models of typewriting machines are in use throughout the world.

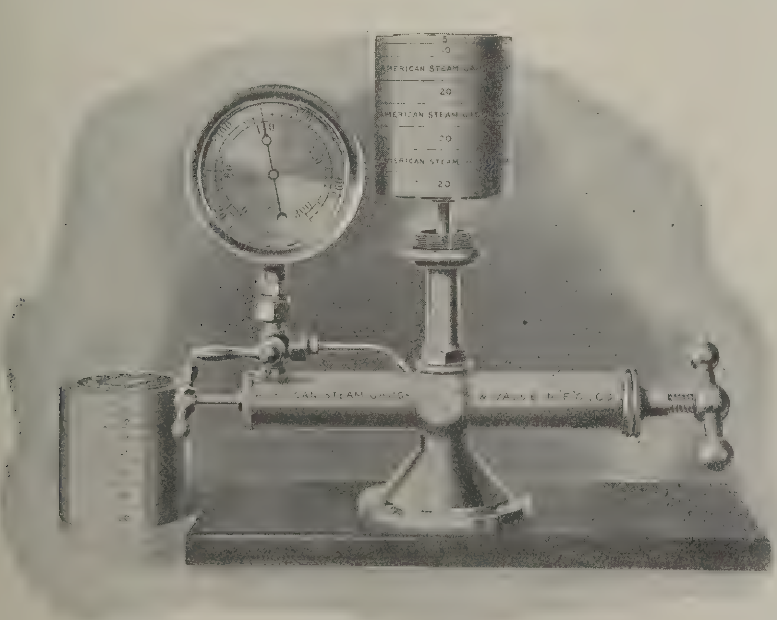
Another exclusive advantage claimed for this machine is that the type bars can be changed to carry the letters and accents of twelve foreign languages. These type bars are inexpensive, and can be inserted quickly and easily, without the use of tools.

IMPROVED INDICATOR FOR TESTING GAUGES.

The accompanying illustration represents a dead weight tester which is being used with the most gratifying results in power plants where accurate gauge testing is a necessity. The principle of the device is very simple, all tests are made with dead weights in 5-pound units, and it is said to be absolutely reliable at all times.

Its novel features consist of an auxiliary cylinder connected with the gauge and main pump cylinders and through a three-way cock, the connection being made by turning the lever cock connected with either gauge to the main pump cylinders, as is desired, eliminating the necessity of pouring oil in and out of the pump cylinders before and after testing.

After the table and piston have been lowered by the first application of weights, and have been raised with the screw plunger, it is only necessary to raise the table and plunger twice while testing to 500 pounds. Another feature is the fact that after completing a test of the gauge, the cock may be turned connecting the gauge with a cylinder, and by pushing in on the plunger the connections and gauge tube can be drained of the oil, thus preventing spilling when the gauge is disconnected.



DEAD WEIGHT GAUGE TESTER.

The gauge to be tested is attached to the nipple connected by union with the three-way cock. The gauge and fittings are then filled by withdrawing the piston; the three-way cock then turns in a position which places the gauge in communication with one of the chambers. When the movement of the index hand indicates what pressure is on the gauge, the three-way cock is turned so as to put the gauge in communication with another chamber. The weights are then applied to the desired pressure, being revolved from time to time to obviate friction. The table and piston operate the pressure about 5 pounds per square inch, and the five, ten and twenty-pound weights sent with the tester are used to obtain the desired pressure for a test.

For foreign shipment the pump is furnished with the following fittings: Necessary wrenches, hand set, hand jack, four connection nipples and pliers. The accompanying weights are furnished in a separate box.

BEATING ABOUT ROBIN HOOD'S BARN.

A recent report of the Canadian Department of Commerce contains a communication from J. S. Larke, Canadian Commercial Agent at Sydney, N. S. W., which would be amusing were it not so serious a comment on methods too often employed by manufacturers, which can hardly be said to work to the advantage of their foreign customers. Mr. Larke writes:

"When in Canada I agreed to find a representative for a manufacturer in this country and succeeded in doing so, but after some correspondence I was advised that the matter had been transferred to the head office in the United States, which had made an arrangement with a New York export firm. This export firm, I am now advised, not having a branch in Australia, arranged with an Australian house to handle the goods, but this Australian house has no equipment for selling these articles. It in turn has transferred the business to a commission man. The consequence is that there are three commissions to be paid where, at the outside, there should be but one. So far no business has resulted, and there is some doubt if, under the circumstances, very much is likely to be done. In the close competition that prevails in the export trade, there are few lines of manufactures that will stand such a loading as this."

TRADE PUBLICATIONS.

Baseball and Lawn Tennis Supplies.—The new 1907 catalogue of the Victor Sporting Goods Company, Springfield, Ohio, covers spring and summer supplies in sporting goods, including baseball, golf and tennis equipment.

Roller Skates.—Catalogue G, of the Samuel Winslow Skate Company, Worcester, Mass., is devoted to ice and roller skates. Several improved models are shown, also some new attachment devices. One of the important features of the late models is an improved steel truss, which prevents any springing or bending of the plates. The catalogue covers racing and polo skates, sidewalk skates, rink skates, etc.

Sporting Boots.—From H. J. Putman & Co., Minneapolis, Minn., we receive a pocket booklet, handsomely illustrated from photographs of their well known line of waterproof boots for sportsmen, ranchmen, engineers and surveyors, etc. Catalogues are also published in the French, Spanish and Portuguese languages.

Electric Fans.—The latest publication of the Robbins & Myers Company, Springfield, Ohio, is of unique design and is known as Bulletin No. 55. It illustrates some of the latest models of "Standard" direct current bracket, desk and ceiling fans.

Electrical Supplies.—Catalogue No. 22, issued by the Manhattan Electrical Supply Company, 17 Park place, New York, is devoted to electrical supplies of all kinds. The book contains 144 pages, and is comprehensively described by its title, "Something Electrical for Everybody."

Gasoline Engines. — The Gilson Manufacturing Company, Port Washington, Wis., is now distributing Catalogue G-4, descriptive of its gasoline engines. These engines are made in four different types, viz., horizontal, vertical, water cooled and air cooled, and all are operated on the four strike cycle. Some general information of value to users of gasoline engines is found in the last part of the catalogue.

"A Treatise on Marine Gasoline Engines," just issued by the Ferro Machine and Foundry Company, Cleveland, Ohio, is a valuable addition to the handbooks on this subject. It is an octavo book of 64 pages and over 200 illustrations, and was designed by the authors to serve as a helpful guide to the prospective purchaser of a marine engine. While it carries with it an appendix of facts and specifications on Ferro engines, it is not in any sense a catalogue. The subject is handled throughout the book from the broad standpoint of marine engine practice in general, and it refers to the design, construction and manufacturing methods used in the Ferro engine only to give special point and illustration to the general principles in marine engine construction.

Motor Boat Engines.—The Strelinger Marine Engine Company, Detroit, Mich., calls attention to the fact that its new 1907 catalogue is particularly interesting in its new scale of prices, which have been made forcibly appealing. The essential characteristics of reliability at all times, economy in maintenance, strength and durability, with perfect ease of control, combine, it is claimed, with low prices to make the "Strelinger" the cheapest marine engine in the world.

Traction Engines.—The catalogue recently brought out by the Best Manufacturing Company, of San Leandro, Cal., contains some interesting data and useful information on the subject of traction engines for hauling. Many illustrations are given showing Best engines at work under varying conditions.

Machinery Lubrication.—Adam Cook's Sons, 313 West Street, New York city, makers of "Albany Grease," are sending to the trade a new booklet dealing with their product and bearing the title, "Machinery Lubrication." The booklet is more than a trade catalogue, as it contains much practical information on the subject of lubrication and an explanation of why "Albany Grease" reduces friction to a minimum. It is of convenient size for the pocket or file and is illustrated by pen and ink drawings indicating various classes of machinery, from automobiles to battleships, that extensively use "Albany Grease" as a lubricant.

"Practical Irrigation." — Pamphlet No. 875 Pl., which has just been issued by Fairbanks, Morse & Co., Chicago, Ill., is a 36 page booklet dealing with the mechanical irrigation problem. It is illustrated with many half-tone reproductions of photographs of irrigation plants in actual operation, covering a wide range of different kinds of installations, and contains information regarding many types of pumping machinery for this purpose.

Sheepskins, Calf and Cow Hide Leathers.—An unusually neat and comprehensive catalogue is being put out by the A. C. Lawrence Leather Company, 95 South Street, Boston, Mass. It lists the company's entire line of leathers and gives a short description of each. The book is attractive in design and conveniently arranged for reference.

Telephone Cords.—Under the title of "Cords," the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has recently issued a small booklet which contains some useful information on the subject of cords for telephone and switchboard use. In addition to featuring the principal cords made by the company it details the manner of manufacturing such equipment.

"How to Pack It" is the suggestive title of a booklet issued by the Hinde & Dauch Paper Company, of Sandusky, Ohio. Paper specialties, especially those for bottlers' use, are illustrated.

AMERICAN EXPORTER

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OUR FIFTH FOREIGN TOUR.

In other pages of this issue the AMERICAN EXPORTER calls the attention of its friends in Europe to the tour which its Editor is to make this summer through that continent. The present is the fifth consecutive tour of this nature undertaken by our representatives, and we venture to hope that equally gratifying results will follow as were undeniable in our previous tours to the Far East, to Europe (two years ago), to South America and to Cuba and Mexico.

Preliminary announcement of this tour was made in our April issue. The trip, as first planned, will be carried out in its entirety and with the object, as already explained, of cultivating still further, and to the extent of our ability, the more intimate acquaintance of European buyers of American goods with original sources of supply, and of fostering the friendly feeling of European merchants toward American products.

While it is happily true that American manufacturers in person are more frequently making visits to their foreign clients, and that foreign importers are visiting the United States in constantly increasing numbers, yet it is believed that such independent and disinterested foreign tours as those which the AMERICAN EXPORTER has planned and successfully carried out cannot fail to contribute materially to the promotion of profitable busines relations, whose foundation rests largely on a general *entente cordiale.* The AMERICAN EXPORTER is not a merchant house; it has no goods to sell, no interests to promote save those of American industries as a whole. Its representative on this tour is not a *commis voyageur.* He hopes and expects to be able to call upon many, if not most, of the leading houses who are interested in American goods and who reside along the route which has been chosen. He would like to have the opportunity of meeting the heads of as many such houses as possible and of discussing their American relations, both old and new. It may not be impossible that in some cases he may be able to give valuable advice and assistance, for the Editor of the AMERICAN EXPORTER, who represents us on this tour, has a wide and general acquaintance with our manufacturing industries, and with export methods and possibilities. We therefore extend a special invitation to all importers and merchants to write to our Editor, addressing Mr. B. Olney Hough, Savoy Hotel, Strand, London, W. C. (at any time during July), for information about any particular kind of American goods in which they may be interested; as to the best American manufacturers in special lines; or on other export subjects.

DIRECT PURCHASES FROM MANUFACTURERS.

It sometimes happens that merchants in foreign countries are deterred from purchasing goods from American manufacturers on account of the small size of an order, which only it may be possible at the time to give, or even the small volume of business which appears likely ultimately to result. There exists no real ground for hesitation in either case, providing always that the goods in question are actually desirable and apparent money makers. Such accounts are usually welcomed by export commission merchants, and connections with a reputable house in this category is often advantageous in several respects and not unduly expensive. However, it is frequently the case that the export house selected, or any export house, has but very trifling business relations with the particular city or district in which the foreign buyer is located, and hence small purchases, through such an intermediary, obtain relatively no advantages, and, especially in regard to freight charges, are landed with prohibitive costs attached. There also exists a pronounced and an apparently growing disposition on the part of many buyers to do away with the interposition of the export merchant, and to transact business directly with the manufacturers or sources of original supply. This is emphatically to be recommended in all cases where relations are of sufficient volume to insure shipments amounting at least to minimum bills of lading, and there is no insuperable objection of any sort to such direct relations, even in cases where but a small lot, a single dozen of an article, for example, is wanted from an individual manufacturer, or from each of several different manufacturers. Not only do many American manufacturers, whose goods are most widely known throughout the world, maintain competent export shipping departments, specialized in this department, and entirely able to give satisfactory service, but even in the case of such other factories as prefer to have their foreign shipments handled by intermediaries, arrangements may readily be made by the foreign importer with any one of a score of New York forwarding agencies to take care of their shipments on exceedingly reasonable terms. Whether such shipments consist of but a single package of goods from one manufacturer or whether a collection of packages is necessary from a number of isolated factories, it is almost invariably entirely feasible to secure prompt as well as economical service. The export specialists who comprise the staff of the American Exporter are always willing and glad to advise our foreign readers in this as in other connections, and we solicit inquiries from importers of American goods whose existing arrangements may not be entirely to their satisfaction or who may be in doubt as to how best to arrange. The American Exporter is not interested directly or indirectly in any factory, merchant house, export house or forwarding agency. Our sole business is that of publishing, and our only interest the promotion of satisfactory business relations between American suppliers' and their foreign clients.

A COMPARISON OF RAILWAY SYSTEMS.

An officer of the Erie Railroad Company, in discussing the question as to whether American railways are over-capitalized, has compiled a mass of statistics, some of which deserve repetition as of interest to our foreign readers:

A comparison of the capitalization of European railroads indicates that the railroads of the United States have issued very much less capital per mile than those of European countries. The following figures are copied from a report on the "Transportation Routes and Systems of the World," issued by the Department of Commerce and Labor, Bureau of Statistics, Washington:

		Capital or Cost Per Mile.
United States	1904	$55,261
Canada	1904	60,504
Uruguay	1899	52,756
Venezuela	1904	70,972
Germany	1903	98,443
Austria	1903	128,334
Hungary	1903	74,056
Belgium (state railroads only)	1903	160,983
France	1902	137,601
Switzerland	1903	104,969
United Kingdom	1904	272,737
Russia	1902	78,333
Finland	1902	32,189
Norway	1904	38,371
Sweden (state railroads)	1904	44,669
Sweden (private railroads)	1902	22,006
Italy	1902	108,212

That the capitalization of American railroads, if it is excessive, has not affected their charges for transportation of freight is, in a measure, indicated by the following comparisons:

FREIGHT RATE PER TON PER MILE.

		Cents.
United States	1905	0.766
Germany	1904	1.352
France	1904	1.428
Austria	1904	1.503
Russia, European	1903	1.018
Russia, Asiatic	1903	1.157
England (United Kingdom)	1903	2.160

PASSENGER RATES PER PASSENGER PER MILE.

United States	1905	1.962
Germany	1904	0.992
France	1904	1.133
Russia, European	1903	0.722
Russia, Asiatic	1903	0.458

These figures were obtained from the Department of Commerce and Labor, Bureau of Statistics, and are from the British Statistical Abstract of Foreign Countries, published by the Board of Trade, London, the Interstate Commerce Commission and the London *Statist*. The Board of Trade figures as to the English railways not giving the average rate per ton per mile, the figure used, 2.16 cents, was found by using the average haul of English railways, assumed by the London *Statist* to be 24.86 miles.

THE AGRICULTURAL WEALTH AND DEVELOPMENT OF WESTERN SIBERIA.

BY HENRY C. CARPENTER.

It is a matter of some difficulty to give in brief form a description of the resources or wealth of a country possessing the area of Siberia, or, in fact, of any single part of Russian territory in Asia. Indeed, so vast is the country that extends from the borders of European Russia to the Pacific Ocean that the average mind is incapable of grasping a true impression of its actual dimensions.

Statistics show that in size Siberia represents one-thirteenth of the land surface of the globe; that it is about one and one-half times as large as Europe and thirty times as large as Germany. Expressed in round figures, Siberia covers an area of 7,143,800 square miles. Some idea of the import of these figures is obtainable when it is considered that the total area of the United States, including Alaska, is 3,090,800 square miles; of China, 4,300,900; British India, 1,917,000, and Russia proper, 2,113,200 square miles, while such a wealthy agricultural country as France covers barely 208,000 square miles. This enormous mileage of Siberia is at present divided into four parts, of which Western Siberia, as that portion bordering on the eastern boundary of Russia is familiarly known, is agriculturally the most important, although not as vast in size as two of the other divisions.

A RUSSIAN HARVESTING MACHINE, URALSK, RUSSIA.

Western Siberia, comprising the rich valleys of the Ob and Irtysh, and the Kirghiz steppe extending from the Trans-Siberian Railroad south to the Caspian Sea, is almost as large as the United States. It is also the most interesting part of Siberia, by reason of the greater progress made in settling the country and of the development of the great Asiatic plains called the Kirghiz steppes.

COSSACK BAND, URALSK.

The steppe land alone is composed of an area of 544,640 square miles. Until recent times this great country had no settled inhabitants, but was the abode of nomads, who from the first spring days till late in autumn lived in the open steppe, sheltered by light movable tents, or "yurtas," and wandered with their herds in a direction determined by ancient custom. These Kirghiz are the last representatives of the Turko-Mongol hordes who used to invade the more civilized countries of Asia and Eastern Europe. They have a Chinese cast of countenance, with round, flat faces and sparse beards, and their habits of living bear a close resemblance to those of American Indians. In winter they live in small wooden huts without chimneys and with open hearths covered by a ceiling, but without a roof. Their summer movable tents are made of wood and woven and felt materials and are often large and commodious, according to the wealth of the owners.

In recent years, especially since the growth in the demand for agricultural products arising from the building of the Trans-Siberian Railway, the Kirghiz have gradually been giving up their nomadic habits and remaining constantly in one locality. This free and irresponsible form of existence was not, however, voluntarily laid aside by the Kirghiz. It was brought about mainly by the government, which in order to obtain a systematic cultivation of the steppes encouraged the immigration of Russian peasants by granting to every man forty acres of land. Considerable portions were detached from the Kirghiz lands for the colonization of the steppes, and the settlements of immigrants from the Cossack territory of South Russia soon began to produce a civilizing effect on the natives. The immigrants introduced farming methods that were new to the Kirghiz and demonstrated the advantages of housing their stock during the winter months, cultivating the soil, and, in short, of leading a stable and settled life in a fixed locality.

The principal source of the wealth of the Kirghiz is cattle. The vast pastures of the steppe region, combined with favorable conditions of soil and climate, give a wide scope to cattle raising. Their herds supply practically all the needs of the Kirghiz, giving them horseflesh, mutton, milk and cheese as food, clothing, household utensils made of smoked skins, water pails and fuel. Horse racing is their one diversion, and so great is their love for their animals that it is manifested in their typical form of greeting. On meeting a neighbor the true Kirghiz prefixes his inquiry regarding the health of his family by a solicitous "Mal-dzhisky?" meaning, "Are the cattle thriving?" The stock raised by the Kirghiz consists of horses, sheep, cattle, goats and camels.

The Kirghiz horse is unprepossessing in appearance, but is tough and wiry. Grazing the whole year around, it is accustomed to all sorts of weather and finds its own fodder. It is small, like the mustang, with small ears, a hooked nose with broad nostrils, muscular chest, low neck, strong feet with flat hoofs, and has a very light and swift pace. The winter, which lasts six months, demands of it a great store of strength and endurance. As a rule, the Kirghiz rides a distance of sixty-five to a hundred miles on the same horse in ten to twelve hours, with only short rests. On a short distance of fifteen miles a horse will travel at the rate of a mile in two minutes without showing undue fatigue.

TARTAR HUT AND WAGON, YENESSEI VALLEY.

Many of the wealthier Kirghiz own and operate American harvesting machinery, particularly mowing machines. It is a common sight to see American built mowers, drawn either by camels or small, shaggy mustangs, cutting the tall grass on the steppes. The grass is stored away in the villages as food for the live stock during the long winter months, when the steppes for hundreds of miles form a frozen expanse of snow and ice. In fact, probably nowhere in the world are American machines put to a more severe test than in this part of Siberia. The summer days are long, and the machines are often worked from daylight, which begins at three o'clock in the morning, until ten and eleven o'clock at night. The usage received by the machines is often the roughest. The mowing is frequently done fifty to seventy-five miles from the nearest village, in localities where lubricating oil cannot be procured. The results are obvious.

STEAMER ON THE OB RIVER.

The future of the Kirghiz steppe borderland lies, however, not alone in the development of its agriculture, but also in its mineral deposits. Iron exists in especially rich quantities, and seams of coal, in various formations, occur frequently. In fact, the mountain ridges of the Kirghiz border contain an almost untold mineral wealth, which is as yet scarcely at all exploited. Gold, silver, lead and copper deposits exist in many parts of the country, particularly in the Semipalatinsk territory, and only a small percentage of them is being worked. Emeralds are also found in considerable quantities, and granite is plentiful. Indeed, much of the granite used in the construction of bridges along the Trans-Siberian Railway was brought from the steppe borderlands.

To return to the customs and habits of the Kirghiz. One of the most interesting phases of the life of these people is their fondness for sports and their peculiar mode is of hunting. Wolves are found on some parts

SIBERIAN WAGON, COSSACK REGIMENT, URALSK.

of the steppes in large numbers, but, contrary to general belief, they are not exterminated or hunted with firearms. The Kirghiz rides to a wolf hunt on horseback, armed with a thick, tightly twisted whip. He is remarkably long sighted and espies his prey at a great distance. When a wolf is detected it is pursued until, exhausted, it is run down, when one blow on the head or nose is sufficient to kill it. Firearms are seldom used, owing to the fact that it is difficult to approach within gunshot.

MUZAK ON THE RIVER OB.

In his dress the Kirghiz pays scant attention to the prevailing styles of Europe. Winter and summer he wears practically the same clothing. On the warmest day one sees these people, in various stages of corpulence, riding at full speed clad in sheepskin garments, the wool next their bodies, and with thick fur caps drawn tightly over their heads and ears. The sight to American eyes is almost sufficient to precipitate sunstroke.

The position of woman among the Kirghiz tribes is similar to that of the Indian squaw. Women make the harness for their lords and masters, weave the cloth for garments, prepare the materials for tents, and, generally speaking, bear the brunt of the drudgery.

SCENE IN OMSK, RUSSIA.

The population of the steppe borderland numbers about a million and a half, or three people to the square mile. The soil varies considerably, but consists for the most part of fertile black earth. The country is bounded on the east and partly on the south by Western China and serves as a natural highway between China and Russia. Thus far its development has scarcely entered its infant stage. Its inhabitants consume few of the manufactured products of the outside world, and the vast territory plays a part of but little consequence in this great country of undeveloped resources. That it is a country of wonderful possibilities is, however, beyond question of doubt, and when the development is earnestly begun we may expect to find in it a region of inestimable consuming power. The rich farming country will require the importation of agricultural machinery and implements and the exploitation of the mines will bring the resulting demand for mining machinery and its accessories. Dairy machinery will follow in the wake of the increase in the prosperity of cattle owners, and what is now a territory of limitless plains will in time rank high in importance with our own Dakotas and other grain producing districts.

FARMERS' WAGONS, ORENBURG, RUSSIA.

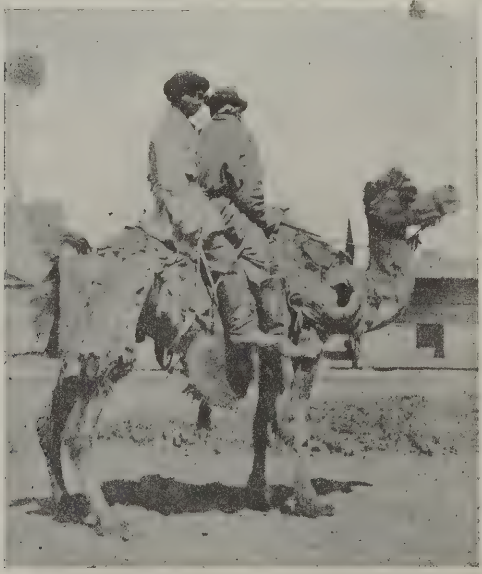
North of the Trans-Siberian Railway, from the boundary of Russia to the banks of the River Irtysh, and beyond the Irtysh, both north and south of the railway, lies the division of West Siberia proper. This country is called the West Siberian plain, or the granary of Siberia. It covers an area of 1,227,350 square miles, and is composed of the two governments or provinces of Tobolsk and Tomsk. The principal towns are Omsk, Tomsk, Petropaulovsk, Kurgan, Barnaul, Tjumen, Tobolsk, Novonicolajevsk, Kamen and Bijsk.

Western Siberia is unquestionably the most fertile section of Siberia. It is intersected by innumerable water sources, and the valleys of the Irtysh and the Ob rivers, which traverse the country from north to south, rank among the most productive agricultural districts in the world. The soil is of rich dark loam, and grain is grown in large quantities.

An already important source of wealth of this district, however, is the butter industry. Previous to the building of the Trans-Siberian Railway many million pounds of butter were annually shipped from Western Siberia, but since the opening of railway communication with Russia the exportation of butter has assumed gigantic proportions. Many Danish firms are engaged in the business of buying Siberian butter for European sale. The butter is shipped in refrigerator cars to the Baltic seaports and thence goes to Copenhagen and English ports. It is of superior quality and finds a ready sale in the markets of England.

The Danish butter merchants also conduct a large trade with the butter producers in harvesting and dairy machinery. Their position as buyers of local produce enables them to command an important machinery trade among the dairies and farmers, and many American farming implements and machines find a way into the country through these channels.

In the making of butter the colonists living within the range of the Siberian Railway have abandoned former primitive methods and now manufacture cream butter with the help of separators and churns. Besides the dairies of private firms, butter factories now exist in many villages, organized for the benefit of the peasants by the Department of Agriculture and the local authorities, and they are provided with up-to-date machinery and appliances.



TWO KIRGHISEN AT URALSK, DWELLERS ON THE STEPPE.

The great agricultural centre of Western Siberia is the city of Omsk, the residence of the Governor-General. Omsk is situated on the eastern bank of the Irtysh River, about two miles from the Siberian Railway, and, while not as large as Tomsk, is the most important city between Tscheljabinsk in Russia and Irkutsk in Central Siberia. It is especially important as a distributing centre for agricultural machinery and implements used in the steppe country and in the valley of the Irtysh. Goods are shipped from Russia to Omsk by rail and thence trans-shipped in steamers on the Irtysh, both north and south of the railway.

TARTAR HUT, YENESSEI VALLEY.

The distributing centre of the Ob valley is the town of Barnaul, which is reached by water from the town of Ob, located at the junction of the Siberian Railway and the River Ob. The important town of Bijsk is also in water communication with Barnaul and Ob. The River Ob is furthermore of great importance in connecting the railway with the mining districts of the Altai Mountains. The Altai mineral deposits are the oldest known in Siberia. Gold, silver, lead, copper and precious stones exist in great quantities, and the excellent means of communication by water will in time render their development comparatively easy. Both the Irtysh and the Ob tap a good part of the district, while the River Toura, connecting with the Trans-Siberian Railway at Tomsk, reaches the remainder of the Altai.

In regard to land ownership in Western Siberia, as I have already stated, the great bulk of the country is the property of the Crown. Only a comparatively small portion of it is owned by private individuals, and then mainly by merchants in the large towns. Peasants emigrating from Russia receive a grant of forty to forty-five acres. In recent years the great agricultural possibilities of the valleys of the Ob and the Irtysh rivers have attracted farmers from Germany, Denmark, Norway and Sweden, and whole communities of these people are springing up throughout the country. As may be appreciated, the advent of these foreigners has had an excellent effect on the farming methods of the native population. They have introduced many innovations, and their example has been of great value to the Siberian peasants in teaching methods of up-to-date farming.

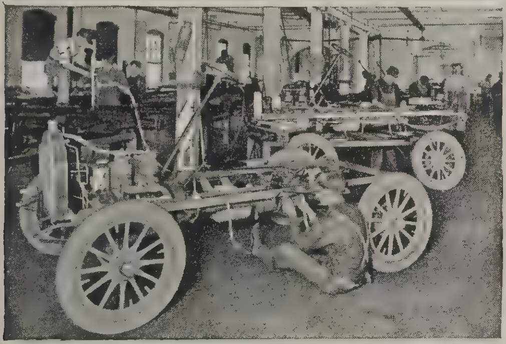
The American observer is, however, forcibly struck by the comparatively small development that has taken place in this region of unexplored riches and by the marvelous opportunities that await intelligent efforts and capital. Time alone will demonstrate the part that Siberia is destined to play in supplying the world's provisions and minerals.

TEST YARD OF A MOTOR CAR FACTORY.

WHY AMERICAN MOTOR CARS HAVE GAINED SUPREMACY.

BY GEORGE E. WALSH.

The influence of motor manufacturing on many allied industries is one of the important features of the phenomenal growth in favor of the automobile in this country, and as a trade factor in the country's development and prosperity it is without a parallel. When we consider that no longer ago than 1900 there were in the United States less than 75 dealers in automobiles, while in 1906 there were 1,600 handling cars direct or through large branch agencies, it is apparent that the industry has made strides with which few other interests can compare. The capital invested in the agency business alone is conservatively estimated at $12,000,000, and more than 20,000 are employed in the sales department of the industry. This is exclusive of the great manufacturing plants, which employ tens of thousands and which represent enormous investment of capital.



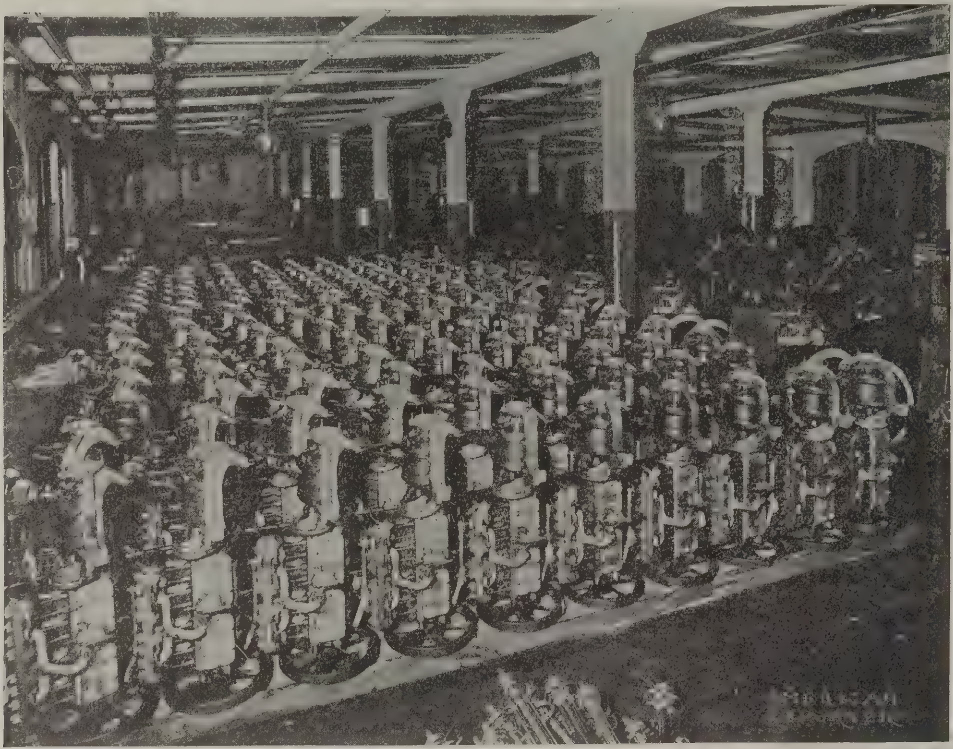
ASSEMBLING MOTOR CARS.

MAKING FENDERS.

In a new industry the failures are generally out of all proportion to the number of firms which succeed. This is due chiefly to lack of experience and of reliable data on which to base predictions for the future. Every industry makes progress through the self-sacrifice of its pioneers. Yet in the case of the automobile the failures of manufacturers have been fewer than in almost any other line of business. This is due to the steady growth in the demand for motor cars and to the fact that early in the history of the enterprise wise heads guided the development of the new industry. Within the past two years not a single responsible manufacturing concern has failed, and the present year finds nearly every factory taxed to its full capacity to fill orders. Indeed, for the past five years one of the pleasant features of this industry has been to work on orders placed ahead. There has been little risk in manufacturing the cars and then trusting to ordinary trade methods of finding customers. How much longer this condition of affairs will continue is uncertain, but for 1907 there are no indications of any decrease in the demand.

MAKING MOTOR CAR WHEELS.

The early makers of motor cars succeeded to a certain extent the manufacturers engaged in the production of bicycles. When the popularity of that vehicle began to decline there were immense plants filled with costly tools and machines that were turned over to the makers of automobiles. The experience obtained in manufacturing bicycles was of great value to the automobile makers. Special tools for turning out crank shafts, chain drives and tubing were utilized at first for the motor car designers. This saved the waste of much capital in dead machinery and tools and prevented many failures that might otherwise have occurred. But since those early days the development of the industry has warranted the designing and construction of costly tool machines for making the different parts of the cars. These tools and labor saving machines have proved a vital factor in the history of the industry. The actual development of the business was halted in its early stages in this country through the devotion of time and labor to create new machines and tools to simplify the manufacture of motor car parts. In France, Germany, Italy and England less attention was given to the manufacture of machinery for making automobile parts than to the perfection of the cars themselves. Such methods of construction were, however, costly and slow. As a result of this Continental cars cost so much that they were not within the reach of the ordinary man. They were a luxury for the wealthy.



A FEW ENGINES AWAITING INSTALLATION.

But American manufacturers held steadily to their aim. Yankee ingenuity and traditions called for machinery which would turn out quickly the different parts of the cars. The building up of such machines was necessarily slow and many mistakes were made at first. Foreign cars were advertised as superior to anything made in this country, and the importations were large. The American made car was looked upon as possessing many inferior points. It was supposed to be "factory made," a term which seemed to indicate that it was not so trustworthy and lacked those little details of finish characteristic of the French, German or Italian cars.

ONE AISLE IN ASSEMBLING ROOM OF A MOTOR CAR FACTORY.

It is only within the past year that the final result of these two methods of manufacture is made apparent. Two years ago American manufacturers reached a point of efficiency in the factories where it was possible to devote more attention to the little details of finish. They had standardized their tools and machinery, and their

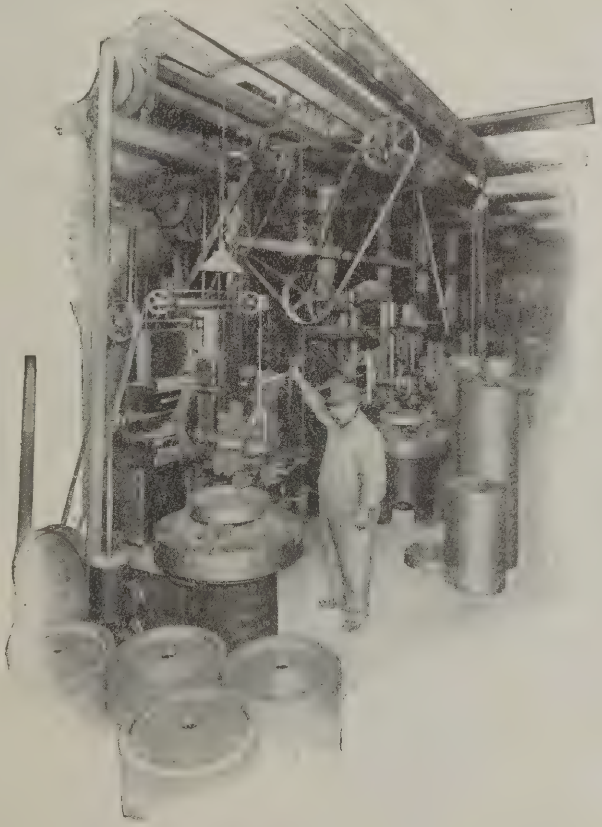
[For the illustrations on this page we are indebted to the courtesy of the Ford Motor Company, Detroit, Mich.—Ed.]

factories were ready to begin the work of turning out parts on an enormous scale. They are to-day making cars which equal those manufactured in Europe. This is recognized abroad as well as at home, and French automobile journals have warned their readers against the American invasion. In 1906 the United States led the world in the number of cars built, with France second. The total of this country last year was 60,000 cars, and for France 55,000. The value of the average American car is placed at $2,000, which would make the total of the 1906 output for this country approximately $120,000,000. To produce this number 111 factories and assembly plants were kept in constant operation, employing 100,000 workers. The invested capital in the factories and manufacturing plants is about $50,000,000, and nearly $20,000,000 is paid out in wages annually.

RUBBING MOTOR CAR BODIES.

This, briefly, is the condition of the trade from a statistical point of view. American manufacturers first developed and perfected the low priced motor car. Recognizing the possibilities of a serviceable, popular runabout at a moderate price, the makers early brought out a line of cars which found no duplicate in Europe. These cars could be turned out rapidly, and at a good profit, as a result of the improved machinery employed in manufacturing the various important parts. In spite of lower wages abroad Europeans could not compete with the small American runabouts produced in factories equipped with special machinery and tools. European makers pretended therefore to scorn the American car and to denominate anything which bore the American trademark as cheap and inefficient. But the demand for the cars in this country was so great that manufacturers had little occasion to bother about the opinion of foreigners. The only imported cars were the high priced ones, and these did not enter into direct competition with the home product.

But within the past year or two the change predicted by the French papers has come to pass. With their manufacturing plants perfected, with elaborate equipments of labor saving tools and machinery, and all parts standardized, American manufacturers began making high priced, high grade cars to compete with the best produced in France or Germany. There was no abatement of the manufacture of the cheaper cars, for their quality was being steadily improved, but the high powered, high grade car was made according to the American system of manufacture. The result of this campaign was shown in recent endurance tests with big touring and Pullman cars, in the international races for speed and in the exhibitions at home and abroad. The invasion of Europe by American cars proposed for this summer will further emphasize this new departure. Hundreds of American cars will tour Europe both for pleasure and for demonstration purposes. Made for the rough roads which prevail in many parts of this country, the American car is more than likely to prove equal, if not superior, to any of the European automobiles when run on the good roads of the Continent. The high grade American cars, moreover, can be produced in American factories at considerably less cost than in Europe. This is due to the constantly increased use of machinery and tools in their construction. In other words, the American method of manufacturing by machinery is bound to prevail in the long run over the slower and more expensive hand labor of European shops.

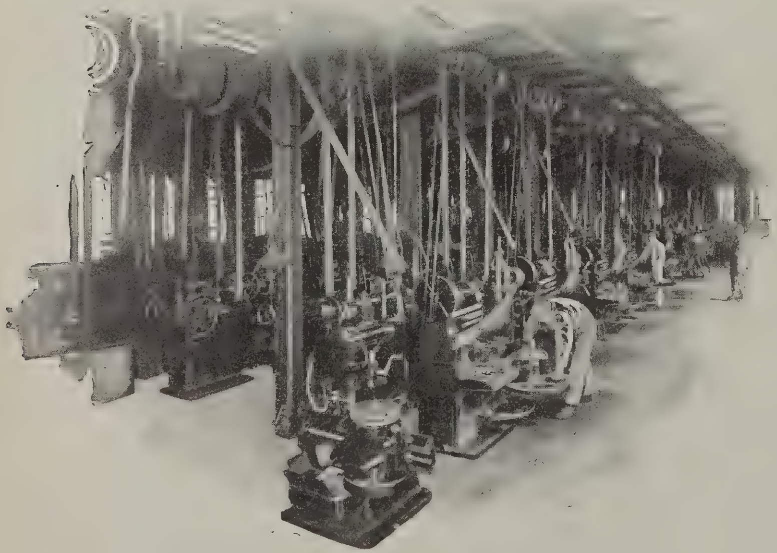


MACHINING FLYWHEELS FOR MOTOR CARS.

Another important point in favor of making American cars more cheaply and of better quality than those produced in Europe is the abundant supply of raw material in this country.

The industry has revolutionized and stimulated many allied industries in a remarkable way. For instance, the current of the rubber trade has been turned into entirely new channels. The demand for rubber tires has been so great that prices have steadily advanced. The old coach builders' trade, which had languished for years, was revived, and the demand for special woods for making tonneaus has had a most important bearing upon our wood supply. Several of the largest carriage builders of the country equipped their plants with new machinery and made a specialty of automobile body building. Instead of suffering from the effects of the demand for automobiles, carriage builders have shared in the prosperity. It has simply been a question of adapting their plants to meet the new conditions.

In the steel trade there has been a similar modification, due to the success of the automobile. The steel plants have found a most profitable market for their high grade steels. More than this, they have experienced an incentive to investigate new lines of steel making. There is nothing which strains steel so tremendously as the powerful vibrations imposed by riding over country roads at fifty or more miles an hour. Steel which would withstand an enormous steady strain would yield under "dynamic" strains. Steel which withstood static loads would fracture like glass when subjected to the shock of constant vibrations. The tests made in this direction rendered it imperative that a new class of steels should be made for the automobile trade. In this work Americans proved leaders. Alloys of nickel and chrome steels were tried, with more or less good results. Finally, within the past year, vanadium was used in American automobile steel making, and a new quality was imparted to steel used for axles, frames, gears and engine shafts. The vanadium-chrome steels are as far superior to the nickel and chrome steels formerly used as the latter were ahead of the common steels of ten years ago. A small quantity of the element vanadium added to the steel while in the process of making imparts to it the quality which automobile engineers have long desired. It increases the strength of the cars immeasurably, reducing the danger of breakdowns and increasing the life of the car from 10 to 50 per cent. The scarcity of vanadium made its general use somewhat costly, but the element has now been found in considerable quantities in sandstone and lead formations in Colorado, Utah, Arizona, California and New Mexico. Already a number of companies have been organized to mine vanadium and reduce it from the rocks in considerable quantities. This alone promises to become an important mining industry. The effect of using only vanadium steels in American motor cars must be to give added prestige to the products which in the next few years will invade Europe in a steady stream.



CUTTING THE GEARS.

THE UPHOLSTERING OF A MOTOR CAR.

In the progress of the electric motor car the storage batteries used in those of American manufacture have shown a decided improvement over all others. The American electric vehicle has a wider range of operation and greater speed than cars manufactured in Germany, England or Italy. In France also the electric motor car has made great strides, and it is the only one that enters actively in competition with the best American made vehicle. In the past few years great strides have been made in increasing the power and endurance of the storage batteries for all classes of vehicles. The gradual adoption of the electric car for city runabouts and for city delivery wagons has been a tremendous impetus to this branch of the industry. The heavy trucks propelled by electric power are more suitable for city streets than gasoline driven vehicles. Where speed and great range of operation are not important factors electricity has entered actively into the transportation question. The improvements have been along the line of the lead batteries, but Edison continues to promise great things for his improved battery, which may revolutionize this method of transportation. Electric cab companies have been organized in New York, Chicago, Philadelphia and other cities for several million dollars, and the demand of these companies for electric vehicles will keep many factories busy for the next few years. A number of electric automobile factories are already capitalized for several million dollars each. In 1900 the greatest mileage obtained by an electric automobile was twenty-five miles on one charge, but in 1906 a run was made from New York to Philadelphia, a distance of a little over ninety-five miles, on a single charge. With the present rate of improvement the electric automobile will soon have as wide a range of operation as desired for almost any kind of business or pleasure.

The great outside interests affected by the automobile trade include not only steel, rubber and lumber, but the electrical manufacturing companies, engine and tool builders, and makers of such specialties as upholstery, cushions, horns, registering instruments and clothing. The extras and accessories of automobiling include such a long list of articles that indirectly over two hundred different trades are touched and improved by the popularity of the vehicles. More than a score of new industries have been brought into existence and a dozen older ones given new life. Several companies manufacturing such small things as spark plugs and igniters are capitalized at hundreds of thousands of dollars. Others making lamps and headlights do a business expressed in six figures. Then there are speedometers, odometers and gradometers that keep several factories running steadily. Scores of little accessories tend to multiply and add to the general business improvement.

The automobile has practically been responsible for the development of the motor boat, which in the past few years has created a new demand. The transference of the automobile engine to a boat first popularized this sport on the water. Then special motor boat engines were designed for small craft, and the public took to motorboating in summer as the motorist did to automobiling the year around. Automobile manufacturers were quick to see the possibility of the new industry, and scores of the established plants started in to make engines for motor boats. In this way they increased their factory output and added a new source of profit. The same factory can easily make the two types of engines, and with almost identically the same tools and machinery produce the desired results in both cases.

VIEW IN TOOL DEPARTMENT OF A MODERN AUTOMOBILE FACTORY.

[The illustrations accompanying Mr. Walsh's article on American Motor Cars, except as otherwise noted, represent typical views in the immense modern factories of the Pope Manufacturing Company, Hartford, Conn.—Ed.]

NOTES ON AMERICAN COTTON.

The total yield of cotton by the dozen or more countries which grow the fibre is practically 20,000,000 bales, as estimated by the census office. The record for three years is given as follows in bales of 500 pounds each, including only cotton for mill consumption.

World's Production of Cotton by Countries, 1906, 1905 and 1904.

Country	1906.	1905.	1904.
United States	13,016,000	10,340,000	13,085,000
British India	3,708,000	2,519,000	2,843,000
Egypt	1,400,000	1,181,000	1,258,000
Russia	675,000	585,000	554,000
China	418,000	415,000	468,000
Brazil	275,000	258,000	210,000
Mexico	130,000	125,000	114,000
Peru	55,000	55,000	40,000
Turkey	107,000	107,000	100,000
Persia	47,000	47,000	45,000
Japan	11,000	15,000	16,000
Other countries	100,000	100,000	70,000
Total	19,942,000	15,747,000	18,803,000

The quantity of American cotton piece goods exported to China in 1897 was 160,000,000 yards and the value $8,750,000, while for 1905 the figures were 563,000,000 yards valued at $33,514,818.

According to the Bureau of the Census the American cotton crops of the last five fiscal years were of value as follows (including the seed):

1902	$501,897,135
1903	660,549,230
1904	652,031,636
1905	632,298,332
1906	721,647,237
Total, five years	$3,168,423,570

The cottonseed alone averaged $82,000,000 a year in value, or in the aggregate $412,000,000 for the five years, leaving $2,756,000,000 as the aggregate value of the five years' crops of cotton alone.

The share of the cotton crop of the United States which is consumed at home is steadily increasing. The figures of the Bureau of Statistics show that in 1876 29 per cent. of the cotton crop of the United States was taken by domestic mills; in 1886, 33 per cent.; in 1896, 35 per cent., and in 1906, 41 per cent.

Adding to the value of raw cotton exported that of other cotton products, whether manufactures from the fibre or from the seeds, the total cotton product exported from the United States during the year will approximate $550,000,000 value, that of cloths and other manufactures of this character being likely to aggregate about $33,000,000, cottonseed oil about $17,000,000, cottonseed oil cake about $17,000,000, and cottolene, lardine and other articles of this class, produced chiefly from cottonseed oil, approximately $5,000,000.

AMERICAN GOODS IN FOREIGN MARKETS.

BY JOHN BALL OSBORNE

(Chief, Bureau of Trade Relations, Department of State.)

In the fiscal year 1906 the exports of domestic merchandise from the United States reached the record-breaking value of $1,717,953,382, an increase of 15 per cent. over the corresponding figures for the preceding year and of about 100 per cent. over those for 1896. The United States is now the greatest exporting country in the world, having surpassed the United Kingdom, the next in rank, for the first time in the year 1905. The six leading countries in order of value of domestic exports are now as follows:

1.	United States	$1,718,000,000	(fiscal year 1906)
2.	United Kingdom	1,605,000,000	(1905)
3.	Germany	1,364,000,000	(1905)
4.	France	939,000,000	(1905)
5.	Netherlands	800,000,000	(1905)
6.	Russia	518,000,000	(1904)

American exports in 1906 consisted of the following great groups, viz.:

		Per Cent. of Total.
Foodstuffs in crude condition and food animals	$177,216,467	10.32
Foodstuffs partly or wholly prepared	347,385,462	20.22
Crude materials for use in manufacturing	500,536,700	29.13
Manufactures for further use in manufacturing	226,210,513	13.17
Manufactures ready for consumption	459,812,656	26.76
Miscellaneous	6,791,584	.40
Totals	$1,717,953,382	100.00

It is frequently stated and generally believed that the great bulk of our exports to the world consist of raw materials, and but a small proportion of manufactured products. This was, of course, the case in former years—for example, in 1880, when raw materials constituted more than 60 per cent. of the total exportation. The foregoing table, however, shows that in 1906 about one billion dollars' worth, or 60 per cent. of the total exports, were articles that had undergone a process of manufacture, leaving only 40 per cent. for absolutely crude materials. This result is obtained by combining the three great groups, "Manufactures ready for consumption," "Manufactures for further use in manufacturing" and "Foodstuffs wholly or partly manufactured," and considering them all as manufactured goods, while the two other great groups represent articles to which labor has added no value in excess of that required to produce them and transport them to the place of exportation.

The gradual but steady increase of the percentage of manufactures in our total exports registers the unceasing industrial development of this country; manufacturing is taking the leading place formerly held by agriculture, mining and lumbering, and in recent years American manufacturers have gained more ground in foreign markets than American producers of raw materials, which, to a large extent, are so indispensable to foreign manufacturers that they "sell themselves." The great staples, such as cotton, tobacco, mineral oils, copper and breadstuffs, are eagerly sought by foreign buyers, and therefore need no exploitation abroad. Their admission into those markets is usually favored by complete exemption from import duties, and, indeed, they are an economic necessity to our commercial rivals, even in the case of countries where the agrarian political influence is strong enough to impose protective duties and burdensome restrictions on sanitary grounds.

But the group of exports in which the AMERICAN EXPORTER'S readers are mainly interested is that denominated as "Manufactures ready for consumption," of which the valuation in 1906 was $459,812,656, or 27 per cent. of our total domestic exports. These exports have been made in the face of the keenest international competition that the world has ever known, and the commercial battleground lies in the markets of every foreign country, but principally, of course, in Europe. In 1870 this class of advanced manufactures constituted only 5.66 per cent. of our total exports; in 1880, 11.26 per cent.; in 1890, 15.68 per cent., and in 1900, 24.15 per cent. The highest percentage yet attained was 26.95 in 1905. The increase will undoubtedly continue very slowly until the domestic demands upon the vast natural resources of the United States become so great as to check the exportation of raw materials, and until new sources of supply are created, particularly for breadstuffs and raw cotton. These conditions are already foreshadowed by the strong competition that American breadstuffs encounter from Argentine products in South America and by the resolute and systematic efforts that some of the leading European countries are making to increase the cotton production in their colonies and thus make their mills less dependent upon the United States for the raw material. In proportion as these restrictive influences upon the exportation of American raw materials come into evidence, the share of manufactured goods will increase correspondingly, and it is not an extravagant estimate to conjecture that within the next fifty years they will form as high as 50 per cent. of our total exports. Although it might be a century, at the present rate of increase, before one-half of our exports in value would consist of "manufactures ready for consumption," it must be remembered that we are on the eve of great changes in international trade, and the economic factors that I have mentioned are certainly shaping themselves to come into play.

Apropos of the relative decrease in our exports of raw materials, it is of interest to note that, notwithstanding that the wheat crop of 1905, represented largely by the exports of 1906, was the largest ever produced in this country, the exports of wheat, including flour reduced to wheat, amounted to only 44,000,000 bushels in 1905 and 98,000,000 bushels in 1906, against an average of over 200,000,000 bushels per annum from 1898 to 1903. The plain inference is that the rapidly growing population of the United States requires an increasing share of its wheat crop, and that hereafter the surplus for exportation will constitute a relatively smaller share in our total exports. Another factor to be considered is the increasing tendency to transform our corn crop into the form of meats before exportation.

In the five-year period from 1902 to 1906 the total exports of domestic manufactures (exclusive of foodstuffs) increased from $453,864,851 to $686,023,169, a gain of 51 per cent. The following table gives some of the principal articles in this group:

Exports of Domestic Merchandise.

Articles.	1902.	1906.
Agricultural implements	$16,286,740	$24,554,427
Brass manufactures	1,930,810	3,474,981
Bricks	500,511	894,032
Candles	286,531	609,188
Carriages, cars and other vehicles and parts of	9,872,516	17,788,425
Chemicals, drugs, dyes and medicines	11,777,176	16,296,642
Clocks and watches	2,144,490	2,597,441
Copper, manufactures of	41,218,373	81,282,664
Cotton, manufactures of	32,108,362	52,944,033
Dental goods	362,000	958,636
Earthen, stone and china ware	600,798	1,080,274
Fibres, manufactures of	4,575,219	8,157,211
Furs and fur skins	5,030,204	8,002,282
Glass and glassware	1,960,106	2,433,904
India rubber, manufactures of	4,032,100	6,543,735
Instruments and apparatus for scientific purposes	5,389,476	10,887,774
Iron and steel, manufactures of	98,552,562	163,984,985
Jewelry and manufactures of gold and silver	1,338,347	1,763,470
Lamps, chandeliers, etc.	963,638	1,954,091
Lead, manufactures of	698,344	729,085
Leather manufactures	29,798,323	40,642,858
Marble and stone, manufactures of	1,589,423	1,185,281
Musical instruments	3,694,143	3,168,052
Naval stores	11,733,562	20,075,585
Nickel and manufactures of	1,203,129	3,424,987
Mineral oils, refined	66,218,004	77,025,196
Vegetable oils, other than cotton seed.	2,316.240	2,232,661
Paints, pigments and colors	2,096,379	3,773,064
Paper and manufactures of	7,312,030	9,536,065
Paraffin and paraffin wax	8,858.844	8,808,245
Perfumes and cosmetics	355,219	534,095
Plated ware	595.626	842,256
Silk, manufactures of	301,758	595,124
Soap	1,630,938	2,781.179
Starch	656,705	1,490,797
Stationery	441,409	594,997
Straw and palm leaf, manufactures of.	368,559	557,583
Tin, manufactures of	517,159	1,069.146
Tobacco, manufactures of	5,668,853	5,410,480
Toys	282,817	570,344
Varnish	607,685	839,070
Wood, manufactures of	44,435,940	65,214,094
Wool, manufactures of	1,512,457	2,119,518
Zinc, manufactures of	799,284	1,833,329

The foregoing table shows that in the brief period of five years our exports of agricultural implements have increased 50 per cent.; vehicles, 80 per cent.; chemicals, nearly 40 per cent.; copper manufactures, nearly 100 per cent.; cotton goods, about 60 per cent.; fibre manufactures, 80 per cent.; fur goods, 60 per cent.; rubber goods, over 60 per cent.; scientific instruments and apparatus, 100 per cent.; manufactures of iron and steel, nearly 70 per cent.; leather goods, about 33⅓ per cent.; naval stores, 70 per cent.; nickel goods, 180 per cent.; paper manufactures, about 30 per cent.; perfumes and cosmetics, about 50 per cent.; plated ware, 40 per cent.; silk manufactures, nearly 100 per cent.; soap, 70 per cent.; starch, about 125 per cent.; tin manufactures, 100 per cent.; toys, 100 per cent.; wood manufactures, nearly 50 per cent.; woolen goods, 40 per cent., and manufactures of zinc, about 130 per cent. These percentages illustrate the enormous expansion of American manufactured products that is in progress in foreign markets. When one reviews these figures and reflects upon their significance he will not wonder at the strikingly increased interest taken by the American public in everything that relates to our commercial development; for example, the tariff schedules of foreign countries and their treatment of American products; reciprocity arrangements between the United States and other governments; ship-subsidy measures; the commercial possibilities of the Panama Canal; the existing Pan-American movement initiated by the wonderful tour of Secretary Root and the Congress of Rio; the recent reorganization of the consular system of the United States, and the increasingly valuable service of our consular offices in the promotion of American trade abroad. There never was a time in our history when the press devoted so much space to matters relating to foreign trade. Several of our leading universities have established departments of commerce and offer attractive courses of study to those who desire to specialize along that line. All these facts demonstrate that the United States is becoming a manufacturing and exporting country of most intense activity, the limits of which development no one can foreshadow.

Next to the amazing growth of the American export trade, the question of the geographical distribution of the exported products is of most interest. Taking for convenience our total exports (domestic and foreign) to the world in the fiscal year 1906, we find that 68.82 per cent. went to Europe; 17.68 per cent. to North America; 4.31 per cent. to South America; 6.05 per cent. to Asia; 2.02 per cent. to Oceania, and 1.12 per cent. to Africa.

Our six best customers in Europe were as follows:

Order.	Countries.	Total.	Per Cent. of Total U. S. Exports to Europe.	Per Cent. of Total U. S. Exports to World.
1.	United Kingdom	$583,090.123	48.59	33.43
2.	Germany	234,742,102	19.56	13.46
3.	France	97,892,480	8.16	5.61
4.	Netherlands	95,471,593	7.96	5.47
5.	Belgium	50,021,107	4.17	2.87
6.	Italy	48,081,740	4.01	2.76

Our three best customers in North America were as follows:

Order.	Countries.	Total.	Per Cent. of Total U. S. Exports to N. America.	Per Cent. of Total U. S. Exports to World.
1.	Canada	$156,736,685	50.82	8.99
2.	Mexico	58,182,278	18.87	3.34
3.	Cuba	47,763,688	15.49	2.74

Similarly our four largest purchasers in South America were as follows:

Order.	Countries.	Total.	Per Cent. of Total U. S. Exports to S. America.	Per Cent. of Total U. S. Exports to World.
1.	Argentine Republic	$32,673,359	43.47	1.87
2.	Brazil	14,530,471	19.33	0.83
3.	Chile	8,667,227	11.53	0.50
4.	Peru	4,833,307	6.43	0.28

Besides those mentioned, the following countries furnished very important markets for American products, viz.:

Countries.	Total.	Per Cent. of Total U. S. Exports to World.
Chinese Empire	$43,774,375	2.51
Japan	38,464,952	2.21
British Australasia	29,001,147	1.67
British South Africa	11,704,668	0.67

Manufactures of iron and steel constitute decidedly the most important group of manufactures in the export trade of the United States. At this writing the Bureau of Statistics of the Department of Commerce and Labor estimates that the value of these exports for the fiscal year 1907 will reach the enormous total of $175,000,000, as compared with $164,000,000 in 1906, $57,000,000 in 1897 and $16,000,000 in 1887. The growth of this branch of our export trade is highly significant. It is gratifying because, in the case of iron and steel manufactures, finished articles form a large share of the rapidly increasing exports; in fact, a larger share than in most other great groups of manufactured articles. An analysis of these exports of iron and steel manufactures reveals the fact that they were chiefly machinery and mechanical appliances, and testifies to the world-wide recognition of our superiority in these lines.

Great as it is, however, the foreign trade of the United States is nothing like what it could and should be. Take, for instance, South America, upon whose markets Secretary Root, in recent trenchant and convincing utterances, has focused the eyes of the American business public. According to the official statistics of the several countries, South America bought last year goods to the value of about $500,000,000, of which only $63,000,000, or 12.6 per cent., came from the United States. Even taking our own figures of $75,000,000 of exports in the fiscal year 1906, the percentage supplied is only 15. If American manufacturers will follow up their awakened interest in the vast trade possibilities of South Amerca with intelligent and earnest action along the lines recommended by the Secretary of State, there is no reason to doubt that our exports to that field will increase by leaps and bounds in the next few years, and the share of the United States will be one-half instead of the present paltry percentage.

Turning to Europe, France affords a good example of our failure to secure a rightful share in the import trade; but there it is a question of a severely discriminatory tariff against American products. In 1905 France imported from the world goods to the value of $922,000,000, of which the United States supplied only $76,000,000, or 8.3 per cent. (our exports of $98,000,000 in 1906 probably represented about the same share). This poor showing is due to the fact that, with the exception of a dozen articles covered by the Commercial Agreement of 1898, dutiable imports into France from this country are subjected to the rates of the French general (maximum) tariff, while like imports from every other important commercial country in the world enjoy the benefit of the minimum rates, which represent reductions below the maximum rates, ranging from 25 to 50 per cent.

Competent authorities believe that the removal of this wholesale discrimination against the United States would cause our exports to speedily increase to the extent of 50 per cent. or even more. As has been recently reported in the press, the betterment of these unfavorable conditions is one of the several questions affecting the foreign trade of the United States that are now receiving the most careful attention of the Department of State.

One of the most interesting phases of the foreign trade situation is the relation between production and exportation. The following table, furnished me by the Bureau of Statistics, shows the census valuation of American manufactures in each census year from 1850 to date and the value of our total exports of domestic manufactures in those years, with ratio of the latter to the former:

PRODUCTION IN AND EXPORTATION FROM THE UNITED STATES OF ARTICLES WHICH HAVE UNDERGONE A PROCESS OF MANUFACTURE, CENSUS YEARS 1850 TO 1905.

YEAR.	Gross Value of Product. Mill. Dols.	Net Valne of Product. Mill. Dols.	Value of Exportations. Mill. Dols.	Ratio of Export to Product. Per Cent.
1850	1,019	*679	43.2	6.37
1860	1,886	*1,257	87.1	6.93
1870	4,232	*2,822	†160.1	5.69
1880	5,370	*3,580	315.2	8.80
1890	9,372	*6,248	403.7	6.46
1900	13,014	8,371	803.0	9.59
1905	14,802	9,821	894.5	9.11

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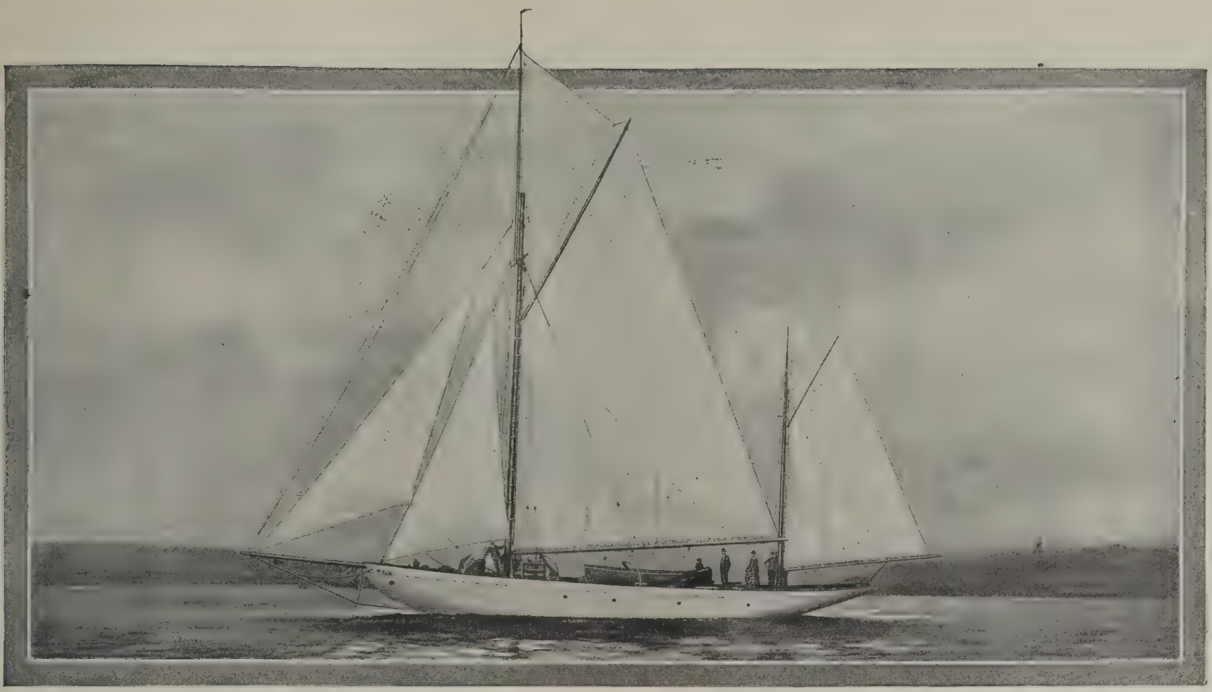
* Estimated at two-thirds of gross value of product.

† Currency valuation of exports.

According to this table, 90.9 per cent. of the total manufactures of the United States in 1905 were consumed in the home market and only 9.1 per cent. were sold abroad. This condition of affairs shows why comparatively few American manufacturers have thrown all the energies at their command into the quest for foreign markets for their products. As soon, however, as the limitations of the home market begin to be felt, for one cause or another, they will be compelled, as a matter of preservation, to give heed to the reiterated advice of American consuls and trade journals in order to secure wider markets in foreign countries. When that time arrives we will witness a commercial campaign of unprecedented energy and earnestness, prosecuted by scientific and systematic methods.



AUXILIARY YAWL "CACIQUE."

POWER YACHT BUILDING IN THE UNITED STATES.

BY PHILIP ARMSTRONG.

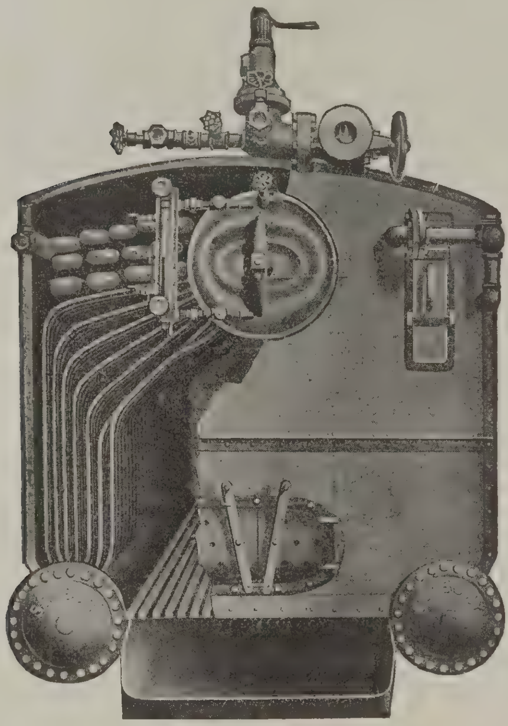
The yachting season in American waters may be said to have opened for 1907 with the two Bermuda races starting from New York, June 5 and June 8. On the former date fourteen sailing yachts competed, ranging in size from a thirty-six foot sloop up to a ninety-foot schooner. Of greater general interest, however, was the motor-boat race starting on the date last named. This race was noteworthy not only because it was said to be the longest and hardest struggle to which this type of vessel has been subjected, six hundred and fifty knots in the open sea, but on account of the necessity of crossing the Gulf Stream. It is true that certain motor boats have crossed the Atlantic, but their voyages have not been made under pressure, while this was a genuine speed contest beside which other so-called ocean races for similar vessels seem child's play. Unfortunately only two boats competed, the "Idaho," 60 feet over all, 53 feet on the water line, motor 4-cylinder, 25 horse power, and the "Ailsa Craig," length over all 59 feet 10 inches, on water line 59 feet, motor 4-cylinder, 60 horse power. The latter boat was especially built for the Bermuda race, and both were designed primarily for seaworthiness. Both made the trip in excellent time and recorded satisfactory performances throughout, the "Ailsa Craig" turning out the winner, as was generally expected. The inauguration of deep-sea racing of this character once more directs attention to the wonderful impetus given American manufacture of motor boats in recent years and the extraordinary development of the industry throughout the United States.

"KANAWHA," FASTEST CRUISING STEAM YACHT IN THE WORLD.

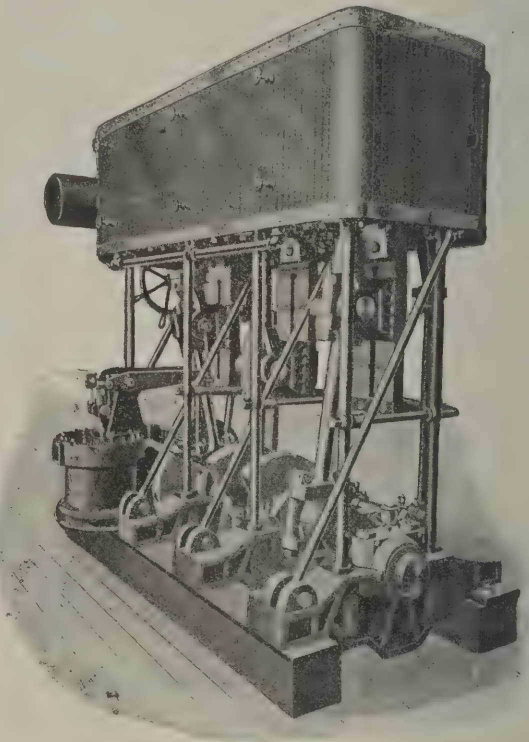
The fact that the United States long since became a negligible quantity in the world's merchant marine sometimes leads in distant lands to the hasty conclusion that there is no shipbuilding in this country. How far this is from the truth is illustrated not only in the case of cruisers and battleships built by American workmen in American yards for our own and for several foreign

U. S. TORPEDO BOAT "BAILEY," SPEED 31 KNOTS PER HOUR.

navies, and in large establishments for coasting vesels, but even more emphatically in the wide distribution throughout the country of exceptionally important plants for power-yacht construction. And whatever may be the fact as to competitive cost of American built yachts, it is not to be denied that in staunchness, in elegance and luxury and thorough completeness of installation of innumerable appliances and adjuncts contributing to comfort and convenience, they are at least twenty years in advance of competing yacht builders in any other part of the world. In this connection the writer is reminded of a visit which he made two or three years ago on board a cruiser built by an American yard for a certain Oriental Power, then lying in its principal port flanked by two other cruisers built for the same Power in European yards. There was but one verdict as to the American built cruiser—it was perfect. And there was but one criticism—it was too perfect. "Our sailors,"



TYPE OF AMERICAN WATER TUBE BOILER.



TRIPLE EXPANSION CONDENSING ENGINE FOR STEAM YACHTS AND COMMERCIAL VESSELS OF MODERN AMERICAN TYPE.

70 FOOT NAPHTHA LAUNCH, WITH 6 H. P. ENGINE.

said the native admiral, "do not understand all these refinements and new inventions; they've never seen anything like them before. These other ships," indicating the European built cruisers on either hand, "have nothing of the sort. They are the plain, old-fashioned boats to which we are accustomed."

STEAM YACHT "VITESSE," 120 FEET LONG, SPEED 28¾ MILES PER HOUR.

The buyer of a gasoline engine or complete yacht must come to the United States if he expects to get the greatest possible satisfaction, for it is in this country that gasoline was first used for this purpose, and here that its development has been pushed farther and faster than in any other country, with naturally resulting improvements and reduction in costs. But it may be confessed that, if he seeks only low first cost, the buyer of a steam yacht can obtain lower quotations in Europe than in America. But in elegance and in perfection of equipment no European built steam yachts approximate the American standard. Facts in regard to the importance of the industry in the United States and the class of our products are more forcibly impressed pictorially, and the reproductions of photographs of American built yachts of varying types which accompany this article should go a long way in informing the ignorant of what has been and is being accomplished in this line in the United States.

GASOLINE LAUNCH USED AS YACHT TENDER, ALSO FOR INLAND WATER SERVICE.

The visitor to New York has not to go far afield to find at least one thoroughly representative American yacht building establishment. Stretching along the Hudson River, in that upper portion of the city of New York known as Morris Heights, there lies a large and particularly complete yacht building establishment that is peculiarly appropriate for citation here as a representative American yard. This plant covers an area of ten acres, four of which are under cover, and possesses a water front of 1,500 feet. Over a thousand skilled workmen are employed, and the history of the concern covers more than a quarter of a century, with a record of many thousand yachts successfully completed. It is far too commonly the practice that the hull of a boat is the work of one firm, the engine is constructed by another, the boilers are secured from a third source, while the cabinet work, structural arrangements and furnishings come from as many other suppliers, resulting in divided responsibility and a lack of unity of purpose. In the case of the Morris Heights establishment there is no conflicting interest. Everything is made on the ground, which embraces shops for furnishing, decorating and electric lighting no less than for the building of special types of engines and boilers. All sorts of yachts are built here, as a cursory glance at our illustrations will demonstrate, for the courtesy of which we are indebted to the proprietors, the Gas Engine and Power Company and Chas. L. Seabury & Co., Consolidated. Tiny yacht tenders and 250-foot steel yachts are equally included in the range of its products—in fact, any sort of boat desired for health, pleasure or business or power relating thereto.

40 FOOT GOVERNMENT STEAM LAUNCH.

In this yard was designed and built the torpedo boat "Bailey," the fastest vessel in the United States Navy, 205 feet long, speed 31 knots per hour—hull, engines, boilers, etc., all designed and built here. One of the most notable examples of larger yachts that claim Morris Heights as their birthplace is the palatial "Kanawha," which is said to be the fastest cruising steam yacht in the world, and has twice been the winner of the Lysistrata Cup. The "Kanawha" is of steel construction, 227 feet, twin screw, equipped with Seabury triple expansion engines and boilers, giving her a speed of upward of 20 miles an hour. Her equipment is wonderfully complete as well as luxurious. The yacht has complete steam-heating, refrigerating and electric light plants, telephonic service between all rooms and an artificial draught system for ventilation. Besides the seven staterooms and four bathrooms in the owner's quarters, there are accommodations forward for a crew of forty-two men, including also seven staterooms with mess and bathrooms for the officers.

An example of a high-speed steam yacht equipped with Seabury water-tube boilers and triple expansion engines is the twin-screw "Vitesse," 120 feet long, with a speed of 28¾ miles per hour. This type of triple expansion condensing engine for yachts, or indeed for vessels in commercial service, is built in these yards in sizes from 75 to 3,000 horse power, and the Seabury safety water-tube boiler for vessels of all descriptions is supplied from 10 horse power up to any size wanted. Both are illustrated here, and each includes individual features of superiority that merit an attention which we have not here the space to give them. The mere fact of their long and remarkably successful use in the United States is to some extent a recommendation in itself. A Seabury compound engine and water-tube boiler are used for the equipment of the steam launches built by this company for the United States Government, as here illustrated. About sixty of this type of launch, from 30 to 40 feet in length, have been shipped, and are in service in various Government departments.

"CHEEMAUN," 60 FEET LONG; SPEED, 15 to 16 MILES PER HOUR.

In the past twenty years this plant has built more than 5,000 naphtha launches, which have seen service in all parts of the world. When this style of launch was first put on the market no other power than steam was being used for such work. The naphtha launch obtained immediate and widespread popularity, which it still maintains in the face of the introduction of many—and some of them cheaper—substitutes. Naphtha and gasoline are practically identical products of petroleum, but the naphtha engine differs from other and properly termed "gas engines" in that the boats are propelled by the expansive and not the explosive force of the naphtha. The naphtha launch, after the test of so many years, has proved very desirable for small pleasure boats, especially on account of its most important elements of safety and simplicity. One type of naphtha launch which we have chosen for illustration is 30 feet long, 6 feet 6 inches beam, equipped with 6 horse power naphtha engine, and standing wood roof with side curtains. Another is an open launch, 18 feet long, fitted with a 2 horse power naphtha engine.

2 H. P. NAPHTHA LAUNCH.

GASOLINE LAUNCH "REVERIE," NOW IN SERVICE IN MEXICO.

Coming now to another form of motive power, we find that the same establishment has not neglected the matter of gasoline marine engines, which are constructed in sizes of from a 1½ horse power motor up to one of 90 horse power, six-cylinder, four-cycle, and installed in a great variety of hulls, a few of which are here illustrated. Besides "semi-speed" and "auto" boats (one of which recently launched from the Morris Heights yards has a record of 31 miles an hour), a wide range of craft is built, from the 14 foot yacht tender equipped with 1½ horse power motor to the auxiliary yawl "Cacique," 76 feet over all. And, in passing, the rapidly increasing popularity of the auxiliary yacht should be noted. The great advances made of late years in gasoline engine construction led naturally to the introduction of machinery aboard sailing yachts. The most successful gasoline engine of 1900 is a caricature of those dated 1907. In the line of auto boats one of the most popular models produced by the Morris Heights establishment has been the 40-foot "Speedway," equipped with four cylinders, 32 horse power gasoline marine engine, giving a speed of from 20 to

21 miles per hour. A large number of these boats are in service in all parts of this country. The other launches which we illustrate are all of them of the twin-screw type, driven by two "Speedway" gasoline engines, giving speeds of from 11 to 16 miles per hour. The models chosen for illustration represent but a few of the exceedingly attractive combinations whose photographs compose in themselves a fascinating art gallery.

The advent of the motor launch has put yachting within the means of thousands who could not have afforded steam yachts. Not only is a motor boat cheaper in first cost, but the saving in the cost of fuel and the small crews necessitated contribute to their rapid growth in popularity. From the comfortable house boat to the swift auto boat, and from the humble tender to the richly furnished yacht from whose davits it hangs, American manufacturers will be found to be competing earnestly and successfully with rivals no matter where located. And whether or not possible or advisable to purchase complete launches here, prospective buyers will make no mistake in choosing American marine motors.

32 H. P. "SPEEDWAY" AUTO BOAT.

The *Engineering News* has compiled from the annual reports of ten leading American railway companies figures showing the expenditure in the one department of line improvements for the fiscal year ending June 30, 1906. The ten important lines, aggregating 53,846 miles, spent an aggregate of $43,130,000 in betterments and improvements, exclusive of extensions and new equipment. This total includes $9,337,000 for double tracking and additional main tracks, $6,168,300 for yards and sidings, $881,200 for signals and interlocking, and $5,406,000 for revision of grades and curvature.

This average of nearly $1,000 per mile on line improvements alone in a single year represents only one of the directions in which railway companies are finding employment for additional capital.

SOLID BRAIDED SASH CORD.

Ordinary twisted cords possess a number of irritating idiosyncrasies all too familiar to dealers the world over. For example, they are apt to kink badly in coming out of the hank, and with wear they untwist and lengthen or stretch. These facts are particularly true of the smaller sizes, and very especially in the case of cord used for hanging window sashes. This use of cordage is one of the most trying to which it is ordinarily subjected, yet at the same time is a matter requiring most intelligent attention on the part of architects and builders. The constant bending of the sash cord over a window pulley is a severe test, to which few sorts are equal in any satisfactory degree. No ordinary cord will answer this purpose, and the volume of the business in this one variety is sufficient to constitute in itself a specialty. That this is not a new development is evidenced by the fact that at least one manufacturing concern has for more than forty years past devoted itself largely to this one variety of cordage. The Silver Lake Company, of Boston, Mass., manufactured sash cord for ten or twelve years before 1869, when the name "Silver Lake" was adopted, which has now come to be recognized the world over as a standard in this particular branch of the cordage industry. In this experience of over forty years two facts of vital importance to the industry have been determined to the satisfaction of the manufacturers. First, cotton is the only fibre that will stand constant bending over a window pulley, to which sash cord is inevitably subjected. Second, the method of "solid braiding" the cotton yarn, twice doubled and twisted, which this company invented and perfected, is the only one that produces a sash cord combining smooth finish and handsome appearance with positive freedom from liability to stretch. The company claim that their braided cotton cord will long outwear any twisted cord even if of greater first strength. By the special method of finishing employed the stretch is positively removed, and there is no untwisting, nor does it kink, thus saving labor and annoyance. Moreover, it costs less per pound than linen or other fibres, and its weight is so slight that it costs less per foot than lower-priced cords.

Sash cord is not, however, the sole product of this large manufacturing plant. The same principle of "solid braiding" is carried out in cords for many special purposes, notably, for example, in a special weather-proof finish for governing the overhead trolley on electric railways where that system is used. For this or other service where cord is exposed to the weather a special waterproof finish is employed, the cord is braided from Italian hemp and linen, and the result is remarkably durable.

The Shogyo Shimpo, one of the largest newspapers in Japan, prophesies that in a few years Japan will practically supply China with all the merchandise she imports.

PROCESS OF MAKING INCANDESCENT MANTLES.

BY M. C. WHITAKER.*

The incandescent gas mantle was invented by Dr. Carl Auer von Welsbach in 1885 and 1886. The development of this great invention made a new epoch in the gas industry and has placed incandescent gas lighting in the front rank of illuminating systems.

The basis of Dr. Auer's invention is the refractory hood or mantle. It is the purpose of this paper to deal with the manufacture of this now well-known article which enters into such universal use in connection with gas illumination.

General Outline of the Process.

Knitting.—A thread of suitable size is knit into a tubular fabric on a machine modified from those used in knitting underwear. A large variety of stitches are made and designated as single weave, double weave, triple weave, etc.

Saturating.—The lengths of knitted fabric are placed in a suitable vessel and the so-called lighting fluid is poured over them. After the fabric is soaked in the lighting fluid for a certain length of time it is put through an equalizer for the purpose of equalizing the amount of fluid carried by each web. The fabric is then placed upon suitable forms of glass or wood and dried.

PREPARING SOLUBLE COTTON.

Sewing.—The fabric is now taken and folded in at one end and carefully plaited and an asbestos cord drawn through to form the head and loop of the mantle.

Modeling.—After the head is made the saturated fabric is shaped over a wooden form.

Burning Out.—The modeled fabric is then hung on a suitable hook and ignited at the top. The thread is burned out, leaving an ash composed of the oxides of thorium and cerium.

Hardening.—After the cotton is burned out the soft, flabby ash is placed over a blowpipe, where the gas and air are controlled in such a way as to blow it out to the form of a mantle.

Dipping.—In order to prepare the mantle for the subsequent handling and for shipment it is dipped into a bath of collodion and allowed to dry.

Trimming.—After the collodionized mantles are thoroughly dried, they are passed to an operator, who trims off the rough edges of the skirt and reduces the mantles to a uniform length.

Packing.—Loop mantles are suspended in paper tubes by cords; cap mantles are mounted on supports and the supports securely fastened to the caps. Mantles are usually packed in cartons of fifty and cased according to the size of the order—being shipped usually in 500 or 1,000 mantles to a case.

It is estimated that the American market consumes about 40,000,000 mantles per year. The great majority of these mantles are made in factories more or less perfectly equipped with a knowledge of the technical side of the business and the necessary machinery and appliances for properly carrying out the processes. A considerable quantity of this production, however, is made by people who could not be rated as manufacturers, who have little or no knowledge of the technical requirements involved in making these goods, and who have no appliances for carrying out the complicated processes. I think as we take up the steps in detail it will be noted that an exceptional amount of study is being devoted to the various operations, and that skill of a high order is required to produce incandescent mantles of good quality.

Detailed Discussion of the Process.

Knitting.—There is no more important constituent entering into the manufacture of mantles than the thread which forms the base from which the mantle is started. Various fibres are used in the spinning of these threads, but the only ones of any commercial importance are cotton and ramie. Artificial silk might be mentioned as of experimental importance.

Furthermore, there are a number of kinds of thread made from the various different materials. For example, a thread may be a single twisted cord, or it may be two cords twisted together, in which case it is known as a

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Condensed from a paper read by M. C. Whitaker before the New England Association of Gas Engineers, Boston, February 21, 1907.

two cord thread; or it may be three cords twisted together, in which case it is known as a three cord thread; or you may have four cord threads or six cord threads. Threads of more than six cords are not made in the sizes used for mantle making. The cost of the thread varies with the quality of the material from which it is made, and also with the number of strands twisted together to form it.

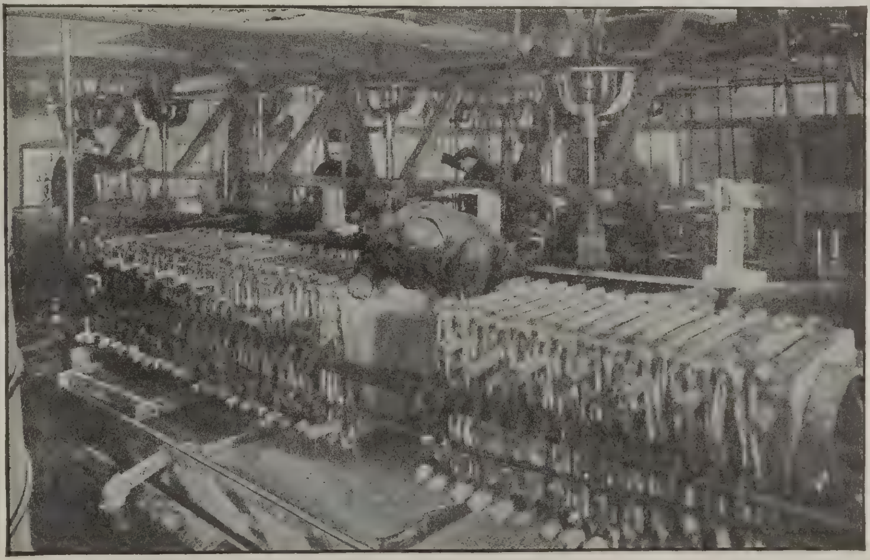
KNITTING THE MANTLE FABRIC.

Cotton.—Among the important qualities of cotton used in making thread there are Upland cotton, River Bottom cotton, Peeler cotton, Allen Seed cotton, Sea Island cotton and Egyptian cotton. Each of these varieties of cotton has its market price, and varies from about 10 cents in the Upland cotton to as high as 30 cents per pound in Egyptian and Sea Island cottons. In the manufacture of mantles of different qualities to be sold at different prices, the distinction starts in with the quality and kind of thread used. In the cheap mantles the three cord and four cord, and in some cases six cord, threads are used, which are made from the lower grades of cotton. The highest grades of mantles require the use of a carefully made six cord thread of uniform size made from the best quality cotton.

Washing.—One of the most important operations in connection with the manufacture of mantles from cotton or any of the other basic fabrics is the washing process. It can be taken as an axiom in mantle making that anything which tends to introduce the slightest chemical impurity into the finished mantle will work great injury to the product. Starting with the thread, therefore, we remove every possible trace of mineral impurity. The purest cellulose fibre which you have ever seen is absorbent cotton, such as that on the market for medicinal and surgical uses. On analysis, this absorbent cotton shows a mineral impurity of from .05 to .06 per cent. Ordinary cotton threads, such as are used in sewing, will show a mineral impurity of practically .5 per cent.

None of these cottons are pure enough for the manufacture of high quality mantles. A thread to produce a first-class mantle must, on analysis, show a mineral impurity of not over .015 per cent., and if it shows a mineral impurity above this infinitesimal amount, it will introduce factors which will affect the physical and lighting life of the mantle.

The washing process used to produce these results must necessarily be very efficient, as there is a marked difference between washing loose cotton, like absorbent cotton, and the tightly twisted threads in the knitted fabric used in the manufacture of mantles. The method of washing is a carefully designed combination of a chemical and mechanical process. The work is done in a room or building especially constructed with a view to carrying out an operation requiring exceptional cleanliness. The chemicals used are the purest substances obtainable; the solutions are all made in distilled water, and all of the mechanical appliances are constructed from materials especially chosen to resist the action of the various chemical agents employed. This equipment must be of such a character as to produce not only the highest attainable degree of purity in the fabric, but must produce it with absolute uniformity. It is obvious that perfect washing of some lots of fabric, with the imperfect washing of


FILTER PRESSES FOR THE PREPARATION OF THORIUM NITRATE.

others, would materially affect the uniformity of the product.

This department is also equipped with apparatus for thoroughly drying the fabric. After it is dried it is cut into pieces sufficiently long to make two mantles. These short lengths of fabric are stored in moisture-proof compartments, ready for the next operation.

Saturating.—Saturating is a comparatively simple process, where the thoroughly dried webbing is placed in a suitable vessel and covered with the lighting fluid. The fabric is allowed to remain in the lighting fluid until it is thoroughly saturated. The excess of fluid is then drawn off and the fabric is put through an equalizing machine piece by piece.

The amount of substance to be used in the mantle is regulated at this point. In the inferior grades of mantles the quantity used is cut down to a minimum and is controlled only by the limit to which the manufacturer can go and produce a mantle which will hold together during the succeeding manufacturing operations.

In the highest grades of mantles the amount of lighting fluid used is based upon a careful consideration of the amount of material required to produce a mantle of the highest physical and candle power life.

Lighting Fluid.—It will be of interest to discuss lighting fluid in connection with this operation. The lighting fluid is composed of a solution of approximately 99 per cent. nitrate of thorium and 1 per cent. nitrate of cerium in distilled water. This solution is usually of about three parts by weight of water to one part by weight of mixed nitrates. While this formula varies somewhat with different manufacturers, the limits are not wide.

MIXING THE "LIGHTING FLUID."

The commercial source of the nitrates of thorium and cerium is from a mineral known as monazite sand. This mineral occurs in commercial quantities only in North and South Carolina and in Brazil. The Carolinas monazite is found in the stream beds of the old mountainous districts, while the Brazilian sand occurs as a beach sand. The supply of sand used by the American manufacturers of lighting fluid is obtained from the Carolinian fields, for the most part consumed by the American Welsbach Company. This company owns and controls mineral rights in North and South Carolina embracing 30,000 acres, and employs between 500 and 600 men actively engaged in mining operations.

This monazite sand is composed of phosphates of such rare earths as cerium, didymium, lanthanum, thorium, etc. It contains 5 to 6 per cent. of thorium oxide and about 20 per cent. of oxide of cerium. The balance of the mineral is made up of phosphates of the other rare earths.

The manufacture of nitrate of thorium from monazite sand is a very difficult and complicated chemical process. It requires from four to six months to recover the small percentage of thorium from the monazite sand and render it sufficiently pure to be used in the manufacture of lighting fluid. The by-products from this process have little or no commercial value, and the thorium must stand the entire expense. The refined thorium nitrate must be chemically pure and free from all trace of mineral impurity and the other constituents of the monazite sand. Its purification is carried to a higher degree than that of any other commercial chemical. It is also a matter of great importance that the lighting fluid made from this nitrate should be absolutely uniform in its composition. This is accomplished by carrying an enormous stock of thorium and mixing aliquot parts from each lot to produce the lighting fluid.

Tying.—Returning to the mantle, the next step is the formation of the head and loop. This operation is accomplished by folding in one end of the tubular fabric and uniformly plaiting the folded portion and sewing an asbestos cord through the plaits. In many American factories this operation is done by machinery, but it is still regarded as better practice on the high grade goods to do it by hand.

The asbestos cord used for this purpose must be made from a carefully selected long staple asbestos fibre, and must contain a minimum amount of cotton binder. In the manufacture as well as in the use of the mantle the asbestos cord is subjected to an intense heat, and unless it has been made from a long staple asbestos fibre with a minimum amount of cotton binder it will disintegrate and render the mantle useless. The workmanship in the tying operation is one of great importance, as it is very apparent that carelessness in this work would produce crooked heads and mantles which would not hang symmetrically when mounted.

Modelling.—The next operation in order is known as modelling, where the operator shapes the saturated fabric over a wooden form. In the ring top style mantle the asbestos cord is tied firmly to the ring of the support at this point, and in the subsequent operations the mantle and support are handled as a unit. The modeller must have skill and experience to produce satisfactory workmanship.

Burning Out.—After the mantle is modelled it is suspended in a suitable hood and a torch applied for the purpose of burning out the cotton. After the cotton is completely consumed the ash of thorium and cerium oxides hangs in a soft, shapeless, flabby condition, and presents a very remote resemblance to a mantle. It is a remarkable phenomenon that this ash should have sufficient cohesive power to hold together after every vestige of the original cotton fabric has been burned away.

MODELING AND HARDENING MANTLES.

When Dr. Auer first explained his idea for making a mantle to Professor Bunsen, that famous teacher replied: "It is extremely doubtful if the ash can be made to hold together." This opinion was based upon Professor Bunsen's knowledge of the general characteristics of metallic oxides, but the combinations of metals with which Dr. Auer was working were exceptions to the rule. The incandescent gas lighting industry rests upon this remarkable exception.

Hardening.—This operation also has some remarkable features. After the cotton is completely burned out in the process just described, the soft, flabby ash is carefully adjusted over a blowpipe. The operator of this device controls levers which raise and lower the mantle and which adjust the gas supply and the air supply to the blowpipes.

Under the influence of this intense blast flame the flabby ash left when the cotton fabric was burned out is blown (by the proper control of the flame) into the shape of a finished mantle, and is changed from its soft, pliable state into a hard, resilient form. This operation requires greater skill and experience than any other work connected with the manufacture of mantles.

The method of handling the mantles in the hardening departments depends largely upon the quality of goods to be produced. The employees are carefully graded according to their skill and experience for the production of the different grades of mantles, and the manufacture of goods of different qualities is carried out in separate and distinct departments.

The cheaper grades of mantles are hardened on automatic machines requiring a minimum amount of labor. The medium grade mantles are hardened on semi-automatic machines at a considerably higher labor cost. The highest grade mantles are hardened by hand, and each individual mantle has the undivided attention of the skilled operator. Furthermore, the highest grade mantles are subjected to both internal and external blow-piping in order to insure a more perfect result from the hardening operation.

The mantle after the completion of the hardening operation is in the condition in which it is used.

Coating.—The object of this process is to preserve the ash in the exact state in which it left the hardening operation while the mantle is going through the inspecting, trimming, packing, transportation and installation stages.

PACKING MANTLES.

This coating or collodion, as it is usually called, is made from soluble cotton. Soluble cotton is made by the so-called nitrating process in which the loose cotton fibre is treated with a mixture of sulphuric and nitric acids, and a product is formed closely allied to gun cotton.

This nitrated cotton, after being thoroughly washed and dried, is dissolved in some of the numerous solvents, such as alcohol-ether, acetone, etc., and a thick, viscous liquid is produced.

It is obvious that one of the very important things about the manufacture of mantles is the manufacture of the collodion which is used to carry the mantle. The careful mantle maker gives almost as much attention to the manufacture of the collodion as to the manufacture of the lighting fluid.

Another feature of the collodion for mantle making might be noted here. It is possible to manufacture a collodion of such a character as to completely hide the defects in the cheaper grades of mantles. These defects would be perfectly apparent to an experienced eye after the mantle is burned off, but by using a collodion such as that just mentioned the appearance of the mantle is improved to such an extent as to enable unscrupulous dealers to substitute a very inferior mantle for a mantle of higher quality.

Collodion is brought into the factory in closed cans and placed in suitable vessels, over which the mantles are suspended and into which they are immersed. This should be done by skilled operators, as there is great danger of injuring the mantles during the process of dipping into the viscous collodion solution. After the dipping operation the mantles are placed in a suitable chamber and allowed to dry.

General.—In summing up this superficial outline of the process for making mantles it must be apparent that it is a process of great complication. These complications are divided into two distinct classes: First—The chemical problems which have to be solved and controlled. Second—The problem of supervising and controlling the work of the employees in the various different operations.

There is no chemical manufacturing industry which requires such a large staff of trained experts as the manufacture of mantles and the raw materials for their production.

The second division of this subject is of no less importance than the first. There are many critical operations in the manufacture of a first-grade mantle. By a critical operation, I mean an operation which if not properly conducted will result in the production of an inferior piece of goods.

The amount of skill required from the employees and the grade of intelligence demanded will exclude mantle making from that class of manufacturing industries which use cheap and ignorant help. The proportion of payroll which goes to the supervising staff is greater in mantle making than in any other manufacturing line. The greatest factors contributing to the success of the American mantle manufacturer are: First, a thorough study and understanding of the technical difficulties involved in the various different processes. Second, a carefully organized and intelligent supervision of every process. Third, the high intelligence, integrity and skill of his employees.

Furthermore, I laid down in the beginning the axiom that any impurity introduced into the mantle in any of the processes would seriously affect the finished product. This makes it apparent that absolute cleanliness of the entire plant, of every operation and of every operator is imperative. In addition to this, the raw materials in the process must be made under the direct technical supervision and control of the mantle manufacturer.

One of the most important results to be desired by both the manufacturer and user of mantles is that the product be uniform. To produce this uniform product it has been necessary for the mantle manufacturer to carry his organization to a limit of perfection which is not known to the manufacturer of any other goods in the American market.

In the discussion which followed the reading of his paper, Mr. Whitaker, who is the general superintendent of the Welsbach Company, of Gloucester, N. J., brought out other interesting facts.

The Indestructible Mantle.—The mantle manufacturers and the students of this business are giving a great deal of attention to improvements in the mantle toward the point of rendering it indestructible. It is a serious question in my mind whether it will ever become as indestructible as, for instance, the carbon filament, because, as I explained to you, the nature of an attenuated ash would immediately bring up to your mind that there must be limitations on the amount of strain this ash can be made to stand, and while great improvements have been made and great improvements will be made, I doubt very much if we will ever have a mantle that can be thrown around.

The higher grade mantles which do not pass the inspection are destroyed, and the ash is turned back and worked over again. The cheaper grade mantles which do not pass the inspection are sold to jobbers, who in turn sell them to fakirs, where they are peddled from house to house and sold at about 25 cents apiece.

Improvements to Meet the Competition from the Gem or the Tungsten Lamps.—I have always believed that we had already met that competition and were quite a little ahead of it as the matter stands. You cannot beat the incandescent gas lighting system for cost; you cannot beat it for the amount of light that you get per unit, and I don't think that we are anywhere near the danger line even in the one watt lamp. I think that we will hold our field despite the fact that our electrical friends claim that the one watt lamp is a reality.

Early in the nineteenth century about 80 per cent. of the male workers of the United States were employed on farms, says *The Engineer.* During the past century the efficiency of labor has been so increased by the farm implements and machines that have come into use, that, at the present time, about 35 per cent. of the male workers produce the food and fibre of the country, and furnish an enormous surplus, which is exported to other countries.

THE NEW SCIENCE OF OPTOMETRY.

By H. B. Graves.

Of the various manufactures which have made noted advances in the United States during the past twenty-five years none has been greater than the manufacture of spectacles and eyeglasses and the instruments and machinery for producing them.

The development of the optical science has shown that not only the aged need spectacles, as was once believed, but that a large proportion of the people have some defect in their vision which is serious enough to produce not only imperfect sight but various physical troubles, of which headache is perhaps the most common.

To overcome these defects careful examination of each eye is necessary, as in actual experience a large proportion of those having defective vision require quite different lenses in each eye to overcome the defect.

To meet this condition several instruments have been invented by which an exact test of each eye can be made and proper glasses prescribed in addition to the time-honored method of testing the eye with test lenses. Many books have been written describing the use of these instruments, and various optical schools and colleges have been founded to teach the science of refraction and the correction of defective vision by means of lenses, both by correspondence and regular courses. Many jewelers and watchmakers have taken these courses and made the optical department of their business an important source of revenue, and in nearly every town of 1,000 inhabitants, or even less, there can be found an optician, either in a jewelry store or practicing in his own office.

So universal has become the practice of carefully fitting each eye separately and prescribing glasses accordingly that it has almost entirely superseded the old custom of trying on frames fitted up with lenses, until one was found which seemed to give comfortable vision.

Another result has been that the use of glasses has largely increased among the young as well as the old, and it is a noticeable fact that the use of glasses has become quite common even among school children, many of whom could not read or study comfortably without them.

The selling of spectacles from stock has thus been largely superseded by fitting each person's eyes with a pair of glasses made up especially to fit not only his eyes but his face, the shapes of noses and widths of faces varying to such an extent as to render this necessary to accomplish the best results.

All American frames are now furnished in dozens with a variety of nosepieces to suit different faces. This enables the optician to fit not only the eyes of the patient but the face also. In this way much more comfortable as well as more neatly appearing glasses are provided.

The trade has gradually changed so that the large factories make up a comparatively small quantity of complete goods with lenses, but supply the frames and lenses separately to manufacturing opticians located in the larger cities, who in turn supply the demands of the retail opticians in their own cities and the smaller towns adjacent, as the growing demand for prescribed glasses made it impossible for the factories to handle the prescription business.

Some of these manufacturing opticians located in the largest cities have grown until they employ a very large number of skilled operatives, making up hundreds, and even thousands, of prescriptions daily, and in the smaller cities the number of employees and prescriptions is in proportion and constantly increasing.

The need for even prompter service than can be given by the large manufacturing opticians, although requiring only from one to three days for the transmission of the prescription and the return of the glasses by mail, has made it necessary for the retail opticians to do part of their own work, and this has created a demand for high-grade machinery for cutting, drilling and edging lenses, and testing completed prescriptions, and even grinding the surfaces of rough lenses.

This demand has been met, and today any optician can at a reasonable expense install a small workshop which will enable him to turn out in his own shop lenses to fill any prescription his examinations may demand.

Our attention has lately been called to the phenomenal growth and development of this industry both in a scientific and mechanical way, and we will take pleasure in answering any questions regarding books, periodicals, instruments or machinery relating to or useful in the industry, which may interest our readers, and should a sufficient interest be manifested we will be glad to publish in our own columns from time to time articles which may be helpful and instructive to any of our readers who are studying and practicing the science of optometry.

The benefit to the race secured by perfect eyesight is incalculable, and those who are in touch with and practicing modern methods of correcting defective sight are assured of a remunerative profession from the moment they are able to examine and fit their patients.

The courses are such that any ordinarily intelligent person can fit himself to begin with a limited amount of study, and his practice will give him valuable experience to further perfect himself in his profession.

The production of corn, or maize, in the United States, which in 1840 was 377,000,000 bushels, touched the billion bushel line in 1870, the 2,000,000,000 bushel mark in 1889, and in 1906 was 2,927,416,091 bushels, and may therefore be expected to cross the 3,000,000,000 bushel line in 1907.

CONCRETE BUILDING BLOCKS.

Concrete blocks are the very latest and newest building material. By latest and newest is meant that only in recent years have they entered the building material realms to an extent that assures their adoption in preference to all other building material. Concrete is not a new material; on the contrary, it is the best and oldest known material put to building uses. It has stood the ravages of time counted by centuries, and it was no wonder then that its adoption in the form of building blocks swept like wildfire throughout the United States. Foreign lands are also learning the fact that at last a building material has been found combining so wonderfully the points of superiority over all others that already the importing of American concrete block machinery into every land on the globe has assumed vast proportions.

One of the leading firms in this line at South Bend, Ind., report to us the exporting of their block machines in the spring months of this year to the Philippine Islands, England, Scotland, Spain, South America, Cuba, Japan, Australia, Africa, Central America, Hungary, and New Zealand, and also state they have over 2,000 machines in the hands of customers in the United States, and are continually compelled to enlarge their facilities. Even the Government engineering departments in foreign lands are investigating as to the use of the material, and here in the United States the Government is using the machines and the product in numerous localities, as also at Panama and the Philippines, where Government buildings are being erected.

The United States Department of Agriculture has issued a special "Farmers' Bulletin," No. 235, under the title of "Cement, Mortar and Concrete," preparation and use for farm purposes. Considerable space is devoted to the subject of concrete building blocks, and the following advantages are enumerated:

1. Hollow block construction introduces a saving of material over brick or stone masonry.

2. The cost of laying concrete blocks is less than for brickwork. This is due to the fact that the blocks, being larger, require a much smaller number of joints anl less mortar, and, being hollow, are of less weight than solid brickwork.

3. A wall constructed of good concrete blocks is as strong or stronger than a brick wall of equal thickness.

4. Concrete blocks, being easily molded to any desired form, will prove to be far more economical building material than stone, which has to be dressed to shape.

5. Experience has proved concrete to be a most excellent fire-resisting material.

6. Concrete blocks, being hollow, tend to prevent sudden changes of temperature within a house, making it cool in summer and easily heated in winter.

7. The hollow spaces provide an easy means for running pipes and electric wires. These spaces may also be used wholly or in part for heating and ventilating flues.

Thus Uncle Sam has placed his stamp of approval on the use of blocks as a building material, and even the farmer is now using them. He buys a machine and

RESIDENCE BUILT OF CONCRETE BLOCKS, LEBANON, OHIO, U. S. A.

cement, and generally is able to secure the sand and gravel on his own property or nearby. Thus he is able to use his machine on the very spot he intends to build on. He requires no preliminary experience. He follows the instructions as to use of the machine, the mixing of materials, the curing of the product, and it is all so wonderfully simple he becomes enthused. The blocks can be made during odd spare time, and if warm quarters can be had in winter they can use that period of farm-work stagnation in making blocks for spring use.

CONCRETE BLOCKS USED IN THEIR OFFICE BUILDING BY MANUFACTURERS OF CEMENT.

The ease with which these machines are operated is best illustrated by quoting from a letter, a copy of which was sent us: "Our boys of twelve years can operate it with the skill and rapidity of men." Another wrote: "Instead of work we consider the operation of the machine as recreation."

Architects who are slow in recommending a new building material are now specifying the use of the blocks. Construction companies are making them. Dealers in building material are making them. Lumber dealers are adding them as a side line, and large companies are everywhere being organized to open plants and manufacture them on a large scale.

People everywhere are recognizing the fact that hollow concrete blocks when properly made—when produced on highly perfected down-face horizontal core machines of correctly proportioned materials, and properly cured—are unsurpassed for beauty and durability. The use of face plates placed in the bottom of the mold, of whatever design wanted, and the employment of a rich facing material, result in the bringing forth of a block perfect in design and finish, and one that becomes harder with age and requires no further cost of maintenance. Not only this, the first cost of erection is also cheapened, because of the rapidity with which the blocks can be laid in the wall and the minimum of mortar used in binding them together. A wall so constructed is a virtual amalgamation, and, as proven by the California earthquake, will withstand Nature's terrific shocks better than all other wall laid materials. Naturally such a material is a joy to the owner in his feeling of security of a fire-resisting building.

The old saying, "The proof of the pudding is in the eating," is aptly proven by an article in the *Cement Era,* a concrete journal published in Chicago. One of its editorial forces visited the city of Milwaukee, and wrote up the cement block industry of that section. The article referred to is entitled: "Residence of Fay L. Cusick, the lumber dealer, who prefers concrete blocks—blocks made on Ideal Machines by the Modern Construction Company":

"One of the pieces of concrete block work which came under the writer's attention, and which is well calculated to make builders sit up and take notice, is the residence of Mr. Fay L. Cusick, in the little suburb of West Allis, the home of the manufacturing plant of the Allis-Chalmers Company.

"The startling fact in connection with this residence is that Mr. Cusick is a lumber dealer. In an interesting little conversation he told why he used concrete blocks in his own residence instead of lumber. He said he estimated the matter very carefully, figuring his lumber at wholesale price, and found that, taking into consideration the durability of concrete, it had a decided advantage. Built with concrete blocks, his house has cost him about $30,000, and built with lumber, at the wholesale price of lumber as it is at present, it could scarcely have been put up for less money.

"Mr. Cusick is an enthusiast in the matter of concrete blocks. He believes that he has a residence which will last him for all time, and which will be satisfactory as long as it lasts. It is built of blocks made on the Ideal Machine. The blocks were furnished by the Modern Construction Company. The basement went through the winter without the least suspicion of frost, and through the spring without any sign of dampness.

"Mr. Cusick is not contemplating going out of the lumber business, but so far as construction for himself is concerned he will use concrete blocks, continuing to sell lumber to those who prefer. He expects soon to begin the erection of other concrete block buildings on his property at West Allis."

CEMENT WAREHOUSE, DIXON, ILL., CONSTRUCTED OF CEMENT BLOCKS.

Another proof offered us as to the reliability of block construction, the saving in the interior of lath and furring by plastering right on the back of the blocks, is the following letter by ex-Probate Judge F. M. Cunningham, who is the present mayor of Lebanon, Ohio. His letter, under date of April 22, 1907, was accompanied by photograph of residence, which we herewith reproduce:

"Replying to your letter of recent date, will say that I built a two-story eight-room house, using the 8x8x16-inch blocks. The broken ashlar forms were selected as being the most desirable. We plastered directly on the concrete walls, using just the regular, ordinary mortar. The result is entirely satisfactory. We have lived in our house one year, and we are delighted with our splendid home. No dampness has appeared at any time; cool and delightful in summer, and warm and dry in the winter. The cost is about the same as a frame house, but a hundred times better for a home. We purchased a machine and made our blocks right on the lot where we built the house. Any ordinary person can make the blocks. It does not require a mechanic."

Further assurances of stability of concrete block construction are offered in their use by cement manufacturers who use concrete blocks in erecting their plants and office buildings, also the homes for some of their employees. We show by illustration the handsome office building of the Sandusky Portland Cement Company as erected at Dixon, Ill.

An expert in referring to the facing of blocks as accomplished on a down-face machine gives three reasons as the objects of facing: 1. Saving in cost of material. 2. Securing a beautiful surface. 3. Making the surface more dense and impervious.

REVISION OF THE UNITED STATES TARIFF.

No little comment has been aroused throughout the United States by the action taken by the National Association of Manufacturers at their annual meeting in New York, May 20-23, in declaring the time ripe for a revision of the tariff. The question came up on the adoption of a resolution reported by the Committee on Resolutions reading as follows:

"Resolved, That the National Association of Manufacturers declares itself in favor of a revision of the tariff at the earliest practicable date and the making of treaties of reciprocity meantime, as originally provided for by the present tariff laws.

"Whereas, The members of the National Association of Manufacturers have, by correspondence, expressed themselves in the proportion of eight to one that to secure a thoroughly intelligent revision of the tariff there should be established a non-partisan Tariff Commission not unlike the present Interstate Commerce Commission, with semi-judicial powers, as, for example, to summon witnesses; this commission to investigate thoroughly and scientifically the various schedules and from time to time submit their conclusions in the form of recommendations to Congress and the Executive.

"Therefore, be it resolved; That the National Association of Manufacturers formally declares itself in favor of such a commission, and hereby instructs its officers to make every reasonable endeavor to secure the appointment of such a permanent commission at the earliest possible date."

But the adoption of this resolution by the convention representing the National Manufacturers' Association was not as strong a proof of the opinion of manufacturers as the inquiry on which it was based. Discussion at the meeting of the association showed quite a difference of opinion last year, and a committee was appointed to correspond with members of the association, and take their opinion on the subject. The vote in the association was the result of this inquiry and a ratification of the decision it showed. The committee that took the vote reported in brief as follows:

"Of those members who have replied to our inquiries upon this subject out of a total of 1,800 members, 350, or 20 per cent., are radically opposed to revision; 8 per cent. are opposed to it at this time on grounds of expediency, lest it unsettle business, etc.; 55 per cent. favor revision—most of them a radical kind, but one-fifth of them wanting only partial revision; 17 per cent. are indifferent or uninformed, or not entitled to vote. Those decidedly wanting revision now, or in the near future, are, therefore, twice those who are either decidedly opposed to revision or opposed to it for the time being. Taken by industries, out of 77 different industries tabulated, 56 vote for revision, casting a total of 1,510 votes; 16 industries vote against revision, casting a total of 102 votes; 5 industries are each tied in their votes, casting a total of 28 votes.

"A Tariff Commission.—One of the most interesting developments of our inquiry is the clear disclosure that our members are overwhelmingly in favor of a tariff commission, with semi-judicial powers, as, for example, to summon witnesses; this commission to investigate thoroughly and scientifically the various schedules, and from time to time submit their conclusions in the form of recommendations to Congress and the Executive."

Among other subjects of general interest discussed at the convention were: Postal Reforms, including a plea for the reduction of domestic letter rates to 1 cent per ounce; Immigration Interests, supported by an eloquent appeal by Hon. Oscar S. Straus, Secretary of Commerce and Labor, who urged the enormous advantages the United States have drawn from immigration, and declared the present evils temporary and local, while the benefits are permanent and national; the creation of a Railways Department for the regulation and control of physical operations as well as rates; Foreign Trade; the Consular Service; Child Labor; and the adoption of a resolution calling for an organized campaign for the education of public opinion to a support of employers in their fight against boycott, blacklist, outrages and other illegal maneuvers of labor unions. The convention closed with a brilliant banquet attended by over 500 members.

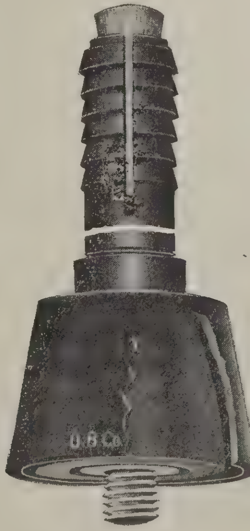
ELECTRICAL INSULATING MATERIALS AND THEIR APPLICATION.

In the generation, transmission and distribution of electrical energy no one factor plays so important a part as insulating material. In spite of its importance, however, there is probably no material used in the electrical industry which is so little understood, even by those who continually make use of it in construction work. To take up the study of insulation is to take up the study of a broad subject. To go into the subject deeply and make analyses and comparative tests of all the various materials and compounds which are used for insulating purposes, and to study the action of these materials under the varying conditions arising in practice has proven to be a task which no one has cared to undertake. Consequently, the available data on this very important branch of electrical work is not only insufficient but widely scattered, being principally collected by manufacturers making this branch of the art a specialty.

As the applications of electricity have increased, what were once supposedly the best of insulators, as glass and rubber, have been found to be totally unfit for certain purposes, and various other materials and compounds have taken their place. This has been the case in the construction of overhead work for trolley systems where insulating compounds are almost exclusively used in the construction of hangers, pullovers, strain insulators, etc., and even in the construction of feed-wire insulators.

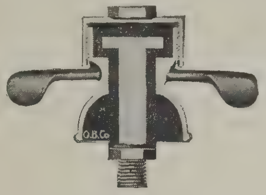
One of the most highly developed insulating compounds is "Dirigo" insulation, which is manufactured by the Ohio Brass Company, of Mansfield, Ohio, and which is the result of years of experiment and practical tests. The company early realized that hard rubber, at first extensively used for the insulation of overhead line devices, was unfit for the purpose, owing to its rapid deterioration when exposed to the weather, and steps were taken to manufacture a compound high in insulating qualities, which would last indefinitely when exposed to atmospheric conditions.

TYPE G, MINE SUSPENSION.

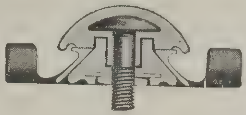


JAMME MINE HANGER.

The present highly perfected state of "Dirigo" insulation may be considered as the result of twelve years of gradual development. Conditions have been studied and performances of the insulation have been carefully watched over long periods of time, so that whenever it has been possible to make changes in the constituents or their compounding, and add to the product greater life, strength or insulating properties, these changes have been made.



TYPE D, TROLLEY WIRE HANGER.


TYPE G, TROLLEY WIRE HANGER.

Requirements of an insulating compound for overhead work are high insulating properties, high tensile strength, ability to resist moisture and ability to withstand any temperature to which it may be subjected in practice without softening. The manufacturer asserts that "Dirigo" insulation embodies all of these four essentials to a higher degree than any other insulating compound on the market. The reason for this is that the ingredients going to make up the compound, such as asbestos, mica, resinous matter, etc., are so proportioned as not to sacrifice any one of the four essentials in order to increase the others. It is comparatively easy, for instance, to manufacture a compound with very high heat-resisting properties by the use of large quantities of asbestos, but perfection so obtained is at the expense of strength and insulating qualities.

A few of the applications of "Dirigo" insulation are illustrated by the accompanying cuts, showing various types of hangers for electric railway and mine trolley-wire systems. The process of manufacturing these various devices is interesting. In general, they consist of two malleable iron or bronze members, one for attachment to the trolley car and the other to the support, which members are held together mechanically and at the same time separated from each other electrically by the "Dirigo" compound.

In constructing the hanger the two members are placed in a set of dies with requisite amount of compound, which is heated until it is of a putty-like consistency. The dies are then placed in a hydraulic press and forced together under high pressure until the compound completely fills the space between the two castings, which are grooved and ribbed, so that the compound, when cool, forms an effectual mechanical union. The sectional views show clearly the gripping surface between the castings and the insulation. Every finished piece is then tested for mechanical strength and for insulation, a very high factor of safety being allowed.

The apparatus used in making the mechanical test is a standard Riehle Bros. testing machine, and that used in making the electrical test a special high-voltage transformer and regulating device, which is capable of developing 20,000 volts alternating current. The mechanical stress applied varies from 3,000 to 5,000 pounds, and the electrical stress from 6,000 to 10,000 volts. The break-down stress, however, in any case would be considerably in excess of these figures. Any article proving defective in the slightest degree in either of these tests is immediately destroyed, so that every piece of material leaving the factory is free from mechanical or electrical defects of any kind which might impair its efficiency.

A NEW MUSICAL INSTRUMENT.

Under the name of the "Dolceola" a new musical instrument has recently been introduced to the trade in the United States, and it embodies many features which are bound to commend it to foreign dealers in this line. Indeed the Toledo Symphony Company (Toledo, Ohio), who manufacture and control it, advise us that agencies have already been closed and a highly gratifying business developed in Mexico, the River Plate, Peru, Queensland and some other territories. In tone the "Dolceola" bears a noticeable resemblance to the early form of the Italian harp, which is recognized as the sweetest toned of all musical instruments. The "Dolceola" is said to be far easier to learn than the piano or any similar instrument; is, in fact, so simple that a child of eight or ten can learn to play it well after half a dozen lessons and a little practice. Any sort of music can be played on it, and in accompaniments to singing it is claimed to be immeasurably superior to any other instrument. Add to these qualities the facts of low price, portability (it weighs but twenty pounds, including a carrying case) and the wide field opened for its general exploitation is readily recognizable.

Mr. J. F. Johnson, president of the Johnson & Field Manufacturing Company, of Racine, Wis., manufacturers of farm and warehouse fanning mills, now exported to nearly all foreign countries, is at present traveling in Mexico, and reports that the business houses there with whom the firm has dealt for many years have favored him this time with very nice orders.

The special Automobile Jack, which is one feature of the varied line of hardware specialties manufactured by Lane Brothers Company, Poughkeepsie, N. Y., is meeting with increasing favor among buyers of motor supplies throughout the world, following its first introduction into England a year or two ago. The extensive line of door hangers made by the same company is reported to maintain its prestige in Germany, Australia, South America, and other markets where the goods are well known. This house also manufactures over twenty different models of coffee mills.

COOKING BY STEAM.

Strong claims are made for a steam cooking device that has obtained a large sale throughout the United States in recent years, and to some extent has also been favorably received in foreign countries, notably in Cuba. The cookers in question are manufactured by the Ohio Cooker Company, of Toledo, Ohio, who claim that their apparatus saves fully one-half the fuel, time and labor involved in other methods of cooking, and in addition cuts grocery and meat bills twenty-five per cent. This apparatus, therefore, ought to commend itself to every enterprising hardwareman and stove dealer, since apart from the intrinsic advantages of the cooker itself it supplies the dealer with material for the strongest possible advertising campaign, certain to appeal to every careful housewife. Several different sizes are made, suitable for families of two or for hotels, all supplied to the export trade at exceedingly attractive prices which provide for liberal profits to the dealer who first introduces them in his locality.

THE HOT AIR BATH.

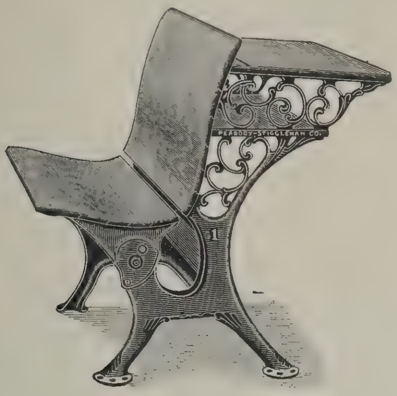
"Five years ago the hot air bath was almost a new thing to the majority of the people throughout the United States. Today there are probably four hundred thousand people making use of the hot air and vapor bath cabinet. The bath for almost two centuries has been practically a lost art. A small percentage of people in large cities during the past thirty years have appreciated and patronized Turkish baths, but even this class of people little realized what the bath had been in the past." This quotation is from a valuable little booklet entitled "The Philosophy of Health and Beauty," for which we are indebted to the courtesy of the Robinson Manufacturing Company, of Toledo, Ohio, manufacturers of a folding Turkish bath cabinet which for several years has enjoyed phenomenal sales in the United States, in England and the English colonies, in Scandinavia and many other parts of the world.

The cabinets in question are sold at so moderate a price as to be within reach of all, are freely endorsed by the medical profession, and thus commend themselves as a peculiarly desirable line to houses throughout the world who devote themselves to specialties or to medical and chemical apparatus and supplies. There is probably more money to be made in an aggressive campaign with such a specialty than in almost any

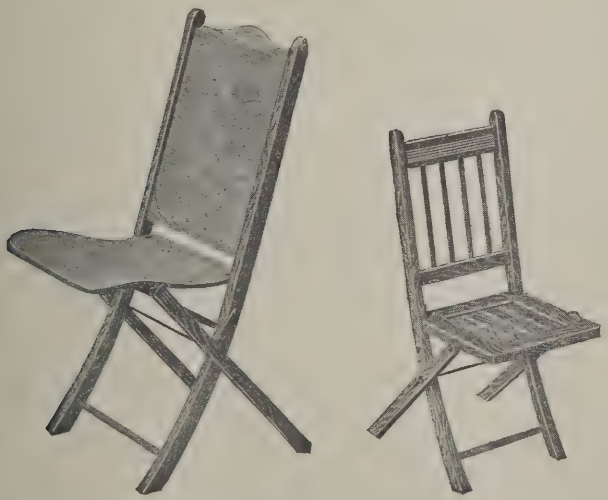
Mexico of today is not the Mexico of thirty years ago. Thirteen thousand miles of railroad track and sixteen thousand of telegraph wire, of which then none were existing, have brought the South into contact with the North, and have destroyed the local prejudices the West may have held against the East.

FURNITURE FOR THE SCHOOL-ROOM.

In no other variety of furniture is American ingenuity and practicality better shown or more widely recognized than in school desks, for one or more American styles form a part of the equipment of many modern school establishments in almost every part of the world. The manufacture of school-room furniture is one of the specialized industries of the United States, and to that fact is probably due the pronounced superiority attained by our makers. The desk which is here illustrated is one of the factors which have contributed to the success of its manufacturers, and as such deserves more than casual consideration. In the trade this is known as a double trunnion and pintle desk. The feature in its construction, which its manufacturers claim is unsurpassed, if not unapproached, by any other desk in the world, is its special hinge of unique yet simple construction. No bolt passes through the axis of this hinge; the castings are broad and heavy, and the fastening of the wood to the iron is continuous from end to end. School desks receive and are expected to receive exceptionally rough treatment. This desk is recommended by the Peabody School Furniture Company (North Manchester, Ind.) as more nearly indestructible than any other, and as at the same time being practically noiseless in operation.



MODERN SCHOOL DESK.



TWO NEW K. D. CHAIRS.

The same concern manufacture several varieties of folding chairs suitable not only for general use but for assembly rooms. Two models are here shown, which are durable and comfortable, and may be had in several different patterns. All desks and chairs made by this company can be shipped knock-down, hence are peculiarly adapted to export trade.

INTERESTING NOVELTIES IN CORDAGE.

Coincident with the increasing popularity of the motor boat there has arisen a demand for accessories of all sorts, which manufacturers in many lines have not been slow to recognize and meet. Our attention has recently been directed to a special tiller rope, for use on power boats, which is one of the new products of the Samson Cordage Works of Boston, Mass. This rope is manufactured on the solid braided principle, but is made with a wire cable center which has proven exceptionally strong and durable in actual use. The process of manufacturing this variety of solid braided cordage is of great interest, involving most ingenious special machinery, designed and perfected by this company.

A similar article, also with wire cable center, is meeting with great favor as signal cord, while other products of the same concern embrace such goods as sash cord, clothes lines, lariats, trolley and arc lamp cord, shade cords, mason's and chalk lines, etc., all constructed on this company's method of solid braiding. The "Samson" trademark has always been confined to strictly high-grade articles, although the company also manufacture cheaper grades to meet competition. Their contention has always been, however, that a slight saving in first cost is deserving of little consideration in view of the liability of cheap cordage to break in the most inconvenient places and at the most annoying times. A certain amount of insurance against such bother and expense is worth paying for in the first instance, and the reputation of the "Samson" brand has been, it is claimed, built up on the quality of the goods. Every foot of this cordage is made of extra quality material by experienced workmen, is carefully inspected, and is guaranteed by the manufacturers free from the rough places which make cheap grades wear out so quickly.

The number of people employed in manufacturing in the United States has grown from less than one million in 1850 to five and a half millions in 1905; the wages paid, from 237 million dollars in 1850 to 2,611 millions in 1905; and the value of products, from one billion dollars in 1850 to nearly fifteen millions in 1905.

RECENT IMPROVEMENTS IN POTATO MACHINERY.

In every department of human affairs the introduction of labor-saving machinery has been followed by a greatly increased production, be the products agricultural, mechanical or textile, and such increases have invariably been followed by a cheapening of the production. The potato industry of the United States offers an exception to this general rule, for in the past twenty-five years the potato yield has increased in volume proportionally faster than the increase in population, but the market value at present is fully equal to the standard of previous years.

With improved methods of culture, the average yield per acre has been increased from 84 bushels to 110. At the rate of 45 cents per bushel (which is under the present value) the production returns about $49 per acre. This maintaining of a high market value, however, may be accounted for by the inability to carry the crop over from year to year, as may be done with wheat or various manufactured goods.

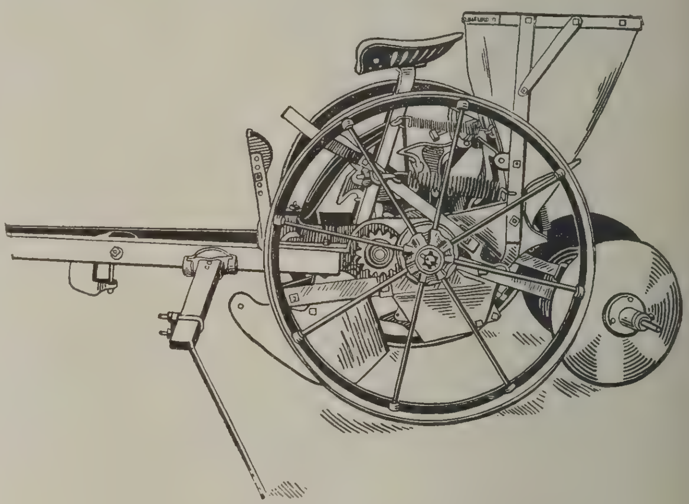
This fact has been a great stimulus to the development of improved machinery for the potato field in the United States, and manufacturers have so carefully studied the needs and wants of farmers that there is now no phase of potato raising, from the preparing and planting of the seed to the harvesting of the crop, for which special machinery is not made. Cutters, planters, sprayers, diggers and sorters have been invented and developed to a high state of efficiency, and on the large farms of the United States the handling of the potato crop is practically all done by machinery, which enables the planting of a large acreage with but a small outlay of time and labor as compared with hand methods.

In the illustration herewith is shown a typical example of a thoroughly modern potato planter. Its makers, the Aspinwall Manufacturing Company, of Jackson, Mich., have been engaged in the manufacture of this class of machinery for nearly half a century. Their products include a full line of potato machinery, in which they claim to be pioneers as well as specialists.

In potato planters the mechanism required to single from the mass potatoes which are variable in size and shape, as well as soft in texture, has been difficult to perfect. However, the machine shown here, in its capacity to handle variable sizes of seed, is said to be so perfect in construction that in average work not more than one or two potatoes in 500 will be missed.

Another important improvement in this machine is the substitution of a canvas hopper for the wooden structure which has invariably been adopted heretofore. This radical departure has also been productive of many changes. Aside from the advantage of a collapsible form, resulting in a small package, which can be shipped much cheaper than formerly, this feature (flexibility) enables the potatoes to feed perfectly to the magazine below, with no bridging or clogging in the hopper. The adjustments are also greatly improved, both as to regulating the feed and tension for covering. Both are controlled from the seat simply by turning a thumb screw.

One very practical feature of the machine is its lightness of draft. It does not require more than one man to operate it, and this lightness of draft and the ease with which the plow can be handled enables a large acreage to be planted in an ordinary working day. The machine is so constructed that the seed may be planted at any depth, and if desired it can be arranged to distribute fertilizer at the same operation. With these machines one man can plant five acres in a day, and each row will be perfectly straight and the seed deposited at a uniform depth. Cultivation of the crop is thus rendered much easier as well as harvesting by machinery greatly facilitated with largely increased economy in costs of the crop.



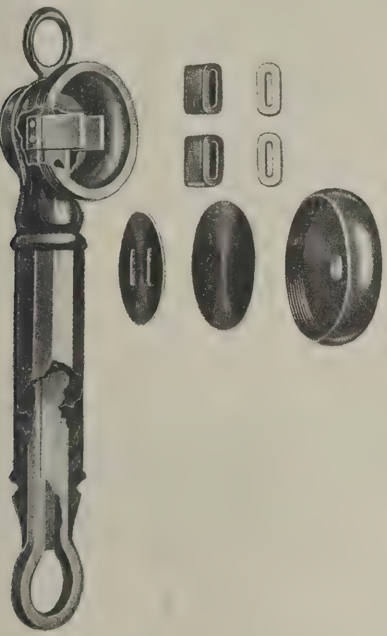
POTATO PLANTER, WITH SACK HOPPER.

More than a million "Climax" bottle wrappers are now being produced daily in the new factories of the Hinde & Dauch Paper Company, of Sandusky, O. This concern has expended over $300,000 in the course of the past year in increasing its capacity and is today probably corrugating more paper for various uses than any other house in the world. "Climax" wrappers already have a world-wide reputation.

The manufacturers of "Simplicity Soldering Salts" (Billings-Clapp Company, Boston, Mass.) are directing the attention of the trade to the fact that they guarantee the safe arrival of their goods. It seems that fluxes put up in liquid form are frequently subject to leakage while in transit, and it is said that one Australian importer recently found two barrels entirely empty out of a total shipment of five barrels of liquid soldering flux. "Simplicity Salts" is a dry preparation, not subject to leakage, is put up in attractive packages, is free from acid, and is claimed to be incomparably easy to use.

MODERNIZED HAND TELEPHONE APPARATUS.

The standard telephone apparatus have until recently been of the general design and construction of those that were in general use from ten to fifteen years ago. It is admitted that with the rapid gowth of the telephone industry the improvement in telephone instruments and apparatus has not been what it should have been in a field open to such vast opportunities. This is the result of an excessive demand, the manufacturer believing it unnecessary to improve his products or change his methods in order to sell his output. The operating companies and subscribers have wanted more efficient and convenient apparatus, but the old manufacturers have, for the reasons cited above, given little attention to this demand. The Wire and Telephone Company of America, of Rome, N. Y., has placed on the market an equipment that meets the requirements not alone of the subscribers but of the operating companies as well. The subscribers demand an instrument efficient, convenient in its use and attractive in appearance. The operating companies, while acknowledging the desirability of these features, have placed greater importance on the question of maintenance.



DETAILS OF LONG MAGNET AND RECEIVER CONSTRUCTION.

Appreciating the advantages and convenience in the use of the hand telephone for many purposes and in many places where it has heretofore been impractical, the company in question produced an equipment of this type that meets every requirement better than the old style or standard instrument. In the "Easophone" equipment, illustrated in this article, the objectionable features that have been a part of the hand telephone in the past have been eliminated, and the more general adoption of the hand telephone is effectively promoted.

The Wire and Telephone Company of America emphasizes particularly the features of this instrument, which make it equally well adapted to local or long distance service. The foundation of the structure is a long horseshoe type receiver magnet, which forms the backbone, as it were, of the hand telephone. Over this is moulded and vulcanized in one piece the handle and receiver case. The transmitter, which is of the solid back type, generally approved for long distance work, is rigidly locked to the annular heel of the horseshoe magnet, affording a solid backing for the transmitter cup. This construction provides a receiver of high efficiency combined with great rigidity and strength. The two electromagnet cores for the receiver are firmly riveted to the horseshoe magnet, making it one solid part. Between the arms of the permanent magnet extends a channel permitting of the easy introduction or withdrawal of cords, which pass directly through the instrument to the receiver.

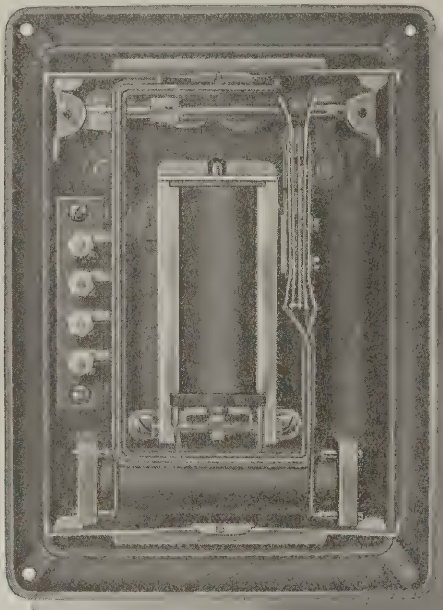
In the transmitter a new method of assembling, invented by this company, does away with the large number of screws heretofore used. The bell box, which is exceptionally small and compact, is made of cold rolled steel finished in black enamel and contains the complete equipment, including a ringer movement of new design, with but one coil, which is one of the patents owned by this concern. The bells are easily adjusted to any required position by the turning of two set screws having their heads on the outside of the box. The switch springs, mounted on hard rubber in two sets, also permit of easy adjustment.

When the telephone is on the hook its weight opposes the tension of a spiral piano steel wire spring controlling the rotation of a shaft, which rotates upon the removal of the telephone, forcing a hard rubber block between the springs and spreading them so that the desired circuit connections are made through their contacts. The binding posts with which the cord terminal block is provided are also constructed on a new mechanical principle, obviating the creeping and cutting of the wire, and at the

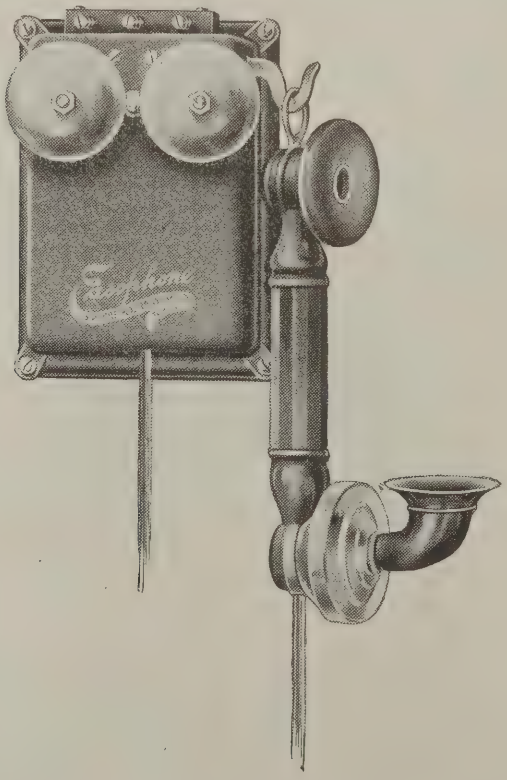
GONGS, SHOWING ADJUSTING SCREWS.

same time giving an exceptionally broad surface of contact.

From this description it will be seen that the design of the "Easophone" and its mechanical and electrical features are both novel and radical. Its exposed parts have been reduced from about 49 in other types to 9. The long horseshoe magnet gives great magnetic intensity at the pole pieces, besides affording a very rigid construction and insuring far better transmission than has ever before been possible in hand telephones. Among other things which are expected to appeal strongly to the subscriber is the extreme flexibility of location. The switch hook is easily reversed or may be mounted separately, and hence the greatest variety of locations on desk or wall is made available.



INTERIOR OF CASE, SHOWING PARTS ASSEMBLED.



EQUIPMENT OF THE NEW HAND TELEPHONE, COMPLETE.

The design of the apparatus was perfected after due consideration of the practical conditions of telephone operation on the part of the experienced engineering force comprising the Wire and Telephone Company of America. These features are not only those which tend to make the instrument convenient to the telephone user and attractive in appearance, but also those which commend it from the maintenance point of view. Durability of structure is believed by the manufacturers to be secured to an exceptional degree through the use of the heavy magnet backbone, in addition to the other valuable features possessed by this radical departure from the usual practice.

THE HOOK SWITCH; MAY BE EASILY REVERSED.

The novel switch hook mechanism and the ringer movement are features which merit thorough investigation.

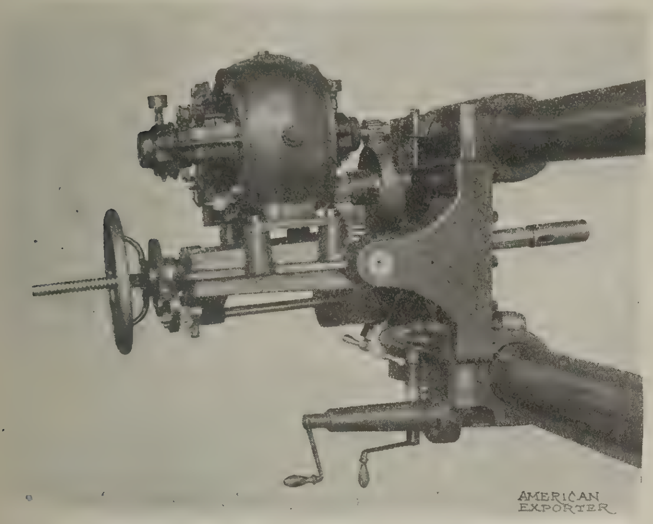
Technical details in further regard to the construction of this interesting type of apparatus, for which we unfortunately have not space here, may be obtained by addressing the manufacturers direct.

USERS OF ELECTRICITY IN NEW YORK.

More than 10,000 users of steam and other power in New York City changed to electricity in 1906, according to T. C. Martin, who delivered the "progress report" at Washington a week or two ago, before the thirtieth annual convention of the National Electrical Light Association. In New York City at the present time electrical energy is supplied through 66,000 meters to 2,461,261 incandescent lamps, 32,320 arc lamps and 140,000 horse power in motors. Additional installations in storage batteries, heating appliances and other devices bring the total use of electricity on Manhattan Island alone to 4,762,218 equivalents of 16 candles.

MOTOR-DRIVEN BOILER SHELL DRILL.

A new boiler shell drill has recently been placed on the market which is said to embody important improvements in machines of this character. The machine is motor-driven throughout, and was designed for the special purpose of taking advantage of high-speed steel. As will be noted from the illustrations, there are two end housings, on the front face of which, carried by brackets, are two 5-inch bars, on which are mounted two independent motor-driven drill heads balanced by the two counter-weights, having a vertical range of 6 feet, and raised and lowered by means of screws actuated by a motor on the top rail of the machine, this motor being handled by a reversible regulator on the inside of the housing, which does not appear in the cut.



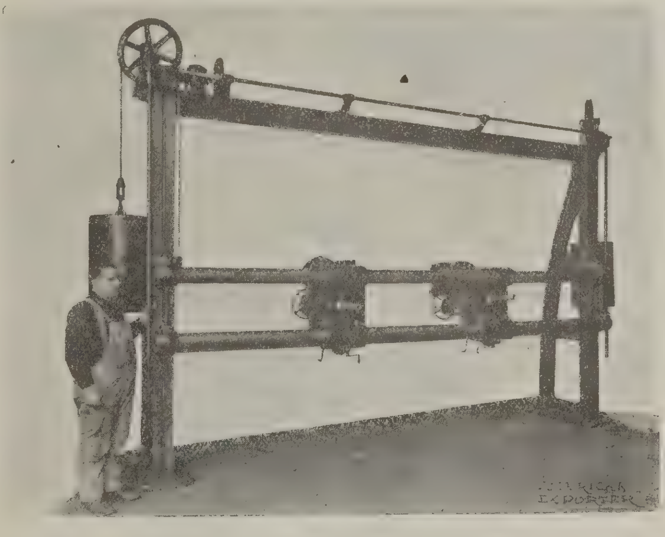
ONE OF THE DRILL-HEADS, WITH ITS INDIVIDUAL MOTOR.

An especially noteworthy feature of this machine is the central position of the spindle, not only between the bearings of the drill head on the bars, but also between the bars. With this arrangement it is claimed by the manufacturers (Thos. H. Dallett Company, Philadelphia, Pa.) that the pressure of the drill against the work has no tendency to set up torsional or sidewise strains in the drill head or bearings, causing excessive friction of the drill in the hole, rapid deterioration of the drill, and undue consumption of power owing to the spindle being thrown out of alignment, as is usually the case where a drill spindle is not central of its supports.

The machine is entirely self-contained, all adjustments being effected by means of crank handles and hand wheels, within easy command of the operator from either side of the drill head. The small cut shows one of the drill heads with its individual motor, and illustrates the method of mounting the gear frame on trunnions. Each drill has a vertical adjustment in itself of 6 inches, operated by a crank handle at the bottom, and is moved along the bars by means of a pinion and rack on the under side of the lower bar. A 2 horsepower variable speed motor is used on this head drill, and there are no bevel gears used in the transmission from the motor shaft to the spindle. The spindle speeds range from 80 revolutions per minute to 160 revolutions per minute, and the whole mechanism of the drill head is especially designed and built for the purpose of using high-speed steel drills if desired.

The spindle, which is 1 13-16 inches in diameter, has a traverse of 18 inches and a perpendicular range through an arc of 15 degrees to permit drilling rivet holes radially to the center of the boiler, which is set on rollers in front of the machine. The last movement is controlled by the hand wheel, which appears immediately beneath the gear reduction. The large cut shows one drill head with the spindle in a horizontal position and the other with it inclined upward.

The feeding mechanism consists of a feed shaft, crank head, rocker pawl plate, pawl, ratchet wheel, feed nut and feed screw, the thrust of the latter being directly upon the back end of the spindle. The connecting rod between the crank and rocker plate is fitted with a spring, which can be set for any pressure of feed, so that it is impossible for this pressure to be exceeded as the spring is compressed when the limit is reached and the feed ceases to operate until the prssure is reduced, thus making an automatic relief. Change of feed is effected by shifting the thumb-latch around the crank head, and a range of feeds from .005 inch per revolution of spindle to 1-16 inch can be obtained. This range of feed covers the entire requirements of drilling in boiler work.



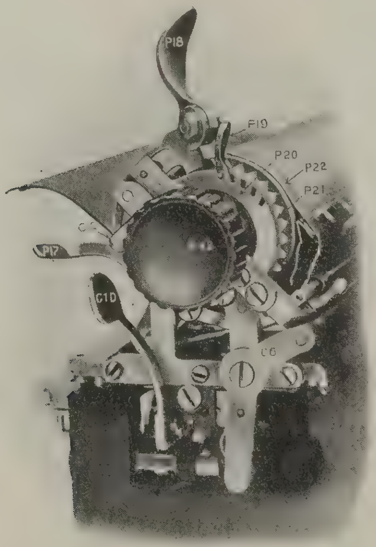
SHOWING ONE DRILL-HEAD WITH SPINDLE IN HORIZONTAL POSITION AND THE OTHER WITH IT INCLINED UPWARD.

When Japan after the war with China, says the *Anglo-Japanese Gazette*, of London and Tokio, took possession of Taiwan (Formosa) the means of transportation on the island were most primitive, but three years later sixty miles of railway had been opened for traffic, carrying in 1898 265,000 passengers and 23,000 tons of merchandise. By 1905 the mileage was 232 miles, carrying 1,144,700 passengers and 350,000 tons of freight, with receipts amounting to $556,000 a year.

PERFECT VISIBILITY IN TYPEWRITING.

The advent on the market of a new model in typewriting machines is a matter of more than passing interest to thousands of importers and dealers the world over. The extent of the interest in American-built typewriters is best observed in the official figures of our export shipments. It appears that for the nine months ending with March of this year four and a half million dollars' worth of typewriters were shipped abroad by American manufacturers, our chief customers being, in the order of their importance as purchasers of these goods, the United Kingdom, Germany, France and Mexico. Not only do our older models seem to be more than holding their own in the favor of users the world over, but there is apparently no limit to the opportunity presented to later comers in this field of manufacture. The effort of designers of new models in writing machines seems recently to have been chiefly devoted to the perfecting of the "visible writing" feature, which every user of a typewriter appreciates the better as his experience with different styles is the wider. Perhaps the latest claimant to favor in this respect is the machine now being offered by the Triumph Visible Typewriter Company, of New York, some features of which we now illustrate and describe as likely to be of interest to a large proportion of our readers, users as well as dealers.

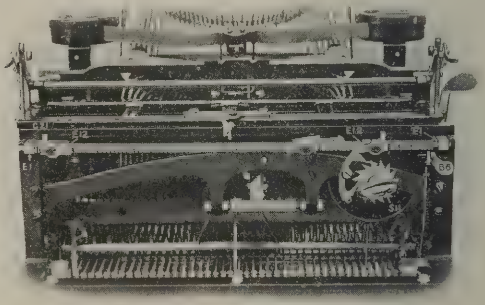
IN FULL VIEW AT AN ANGLE OF 90°.



LEFT END OF PLATEN, SHOWING SPACING DEVICE.

The theory of the manufacturers of the "Triumph" typewriter has been that in reading a paper or book is always held in an inclined position, so that a full view at an angle of 90 degrees is obtained, and that, therefore, the perfecting of the "writing in sight" feature in a typewriting machine depended upon putting the operator in a position to read her work as it progressed with all the ease and comfort she would naturally seek were she holding a book in her hands. In some of the so-called "visible" machines this reading is made very difficult, and is possible only at a very bad angle of vision. In some machines the operator must bend over and read on top of the platen. In others she must peer down and under the platen. The photograph here reproduced illustrates in a striking manner the claim of the "Triumph" to superiority in this respect.

Other features which the manufacturers of this machine claim are unique and are unknown on other machines, include devices for adjusting the touch of the whole keyboard, the tension of each separate key of the keyboard, and the escapement. These devices are so simple that every operator can adjust for himself the touch and action merely by turning a few screws. The screws K31 in the rear view of the mechanism here shown are the control by which the escapement is easily adjusted, and this is, of course, the very heart and life of a typewriter.

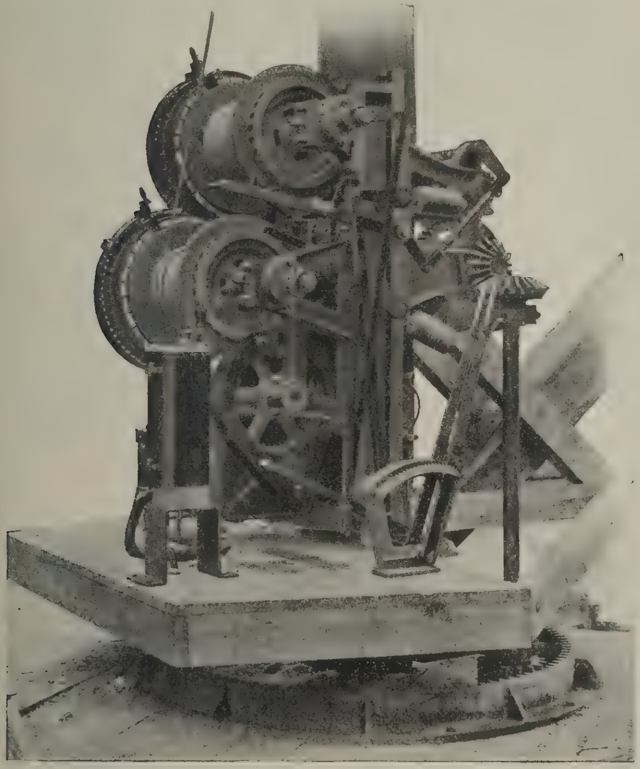


REAR VIEW INTO MECHANISM, PLATEN REMOVED.

Provided with the Universal Keyboard, the "Triumph" has a platen 20 spaces wider, giving 10 more characters than other machines. It is equipped with all the necessary letters, signs and accents required for various foreign languages, and in the "Triumph" the accent prints over the letter but the carriage does not move, a feature of invaluable convenience. There is practically no limit to the adjustment of the spacing. By moving the space switch the operator can write with intervals of 2, 3, 4 or 5 lines, can adjust the spacing to 1-32 of an inch, making easy the writing on ruled paper, and as everything is done in sight, tabulations and insertions are of the utmost simplicity. In addition, the "Triumph" is sold at a moderate price.

NEW ELECTRIC MAST HOIST.

A new type of electric mast hoist developed by the Lidgerwood Manufacturing Company, of New York, to meet some exacting modern engineering conditions, is shown in the accompanying cut. The special feature of the new hoist is that it is wholly complete in itself, containing not only the electrical motor, controller and resistances, the two drums for operating the boom and fall lines of the derrick, but also the boom swinging gear, thus giving the operator full control of every operation of his derrick while he stands constantly facing his work.



NEW ELECTRIC MAST HOIST.

Compactness was the dominating requirement for the new hoist, but there was also included a demand for high power, perfect reliability and handiness in action. The new hoist, as shown in the cut, is operated by a 250 volt direct current General Electric motor. They are also made to operate on alternating current with induction motors. The hoist has a nominal capacity of 4,000 pounds, lifted at a speed of 130 feet per minute. The drums, which measure 12 inches in diameter and 19¾ inches face, are each complete, with brakes, ratchets and pawls giving full control over them at all times. In addition to the regular brakes operated by foot levers, these and all other Lidgerwood Electric Hoists are fitted, when required, with electric solenoid brakes. The solenoid brake is in many instances very desirable as a matter of convenience and added safety. This brake is applied to the shaft of the electric motor. When the operating current is turned on to the motor it passes through the coils of the solenoid, lifts the armature and automatically releases the brake. When the current is shut off, or in case of its being cut off by accident, the armature falls and its weight sets the brake with power sufficient to hold the entire load of the hoist.

Persons familiar with hoisting work will see from the illustration that all the operating levers, pawls and controller handle are arranged so as to be in the handiest positions possible for the operator. This is a feature of the entire new line of Lidgerwood Electric Hoists. They are all arranged so that every operative part is ready in hand and in plain view, and also so that hoisting engineers used to the Lidgerwood Steam Hoists find everything on the electric hoists convenient for their use. Any person who has watched a hoisting engineer at work will appreciate the importance of this feature. The hoisting engineer has his attention intently fixed at all times on the derrick load or on the signalman directing his movements. He has not time or chance to look at his engine. He clutches a lever here and presses a foot brake there, catches or releases a pawl, and turns on or turns off the power, and the machine must answer his every movement at once and with certainty. If it does not life and property are endangered. An engineer used to a steam hoist does not have to relearn his trade when he is called upon to handle a Lidgerwood Electric Hoist.

The use of electric hoists is increasing with remarkable rapidity. This is not only true in cities where current is naturally becoming more and more available but also in remote regions where current has to be specially generated for this and other power purposes.

A large percentage of the mining hoists now being built are for electric operation, and many large engineering undertakings are supplied with power throughout from their own generating plants. The economy and ease of distributing the power in this way are important factors in increasing the demand for electric hoists and other electrically operated machines.

With liabilities of $6,500,000 and assets estimated at $8,000,000, Milliken Brothers (incorporated), of New York, engaged in the manufacture of structural steel and iron and in contracts for structural steel construction, allowed themselves to be put into bankruptcy on the petition of four creditors on June 10. The business was established fifty years ago. Up to 1890 Milliken Brothers confined their attention to iron commission business, but after that date they began iron and steel contracting and installation, making rapid progress and operating in various parts of the world. They had branches at Pittsburg, San Francisco, Havana, the City of Mexico, Honolulu, Johannesburg and Cape Town.

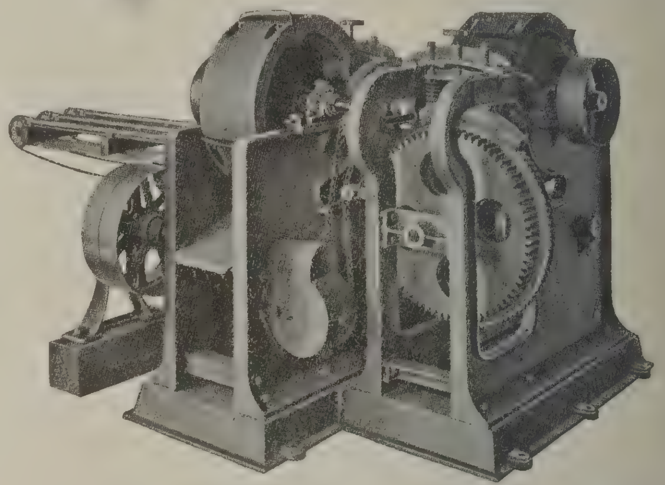
The United States Steel Corporation has recently booked an order for 14,000 tons of steel rails for export to Peru.

THE PREPARATION OF PLANT FIBRES FOR ROPE MAKING.

The rise in price of fibre for rope making has induced many planters in the tropics to pay more attention to the cultivation of plants of the Agave family. The low prices of coffee also have forced many planters to abandon its cultivation and seek something more profitable. Large plantings of the Agave sisaliensis have been made all through the Central American republics, and also in Colombia and Venezuela. Not a few of the West Indian islands have proven that long neglected plants which nature has supplied are a source of wealth and give good returns if proper care is given to their development. Amongst these islands Santo Domingo, Cuba and the Bahamas are particularly prominent. While the two first-mentioned islands have cultivated the regular sisal plant, the Bahama Islands are developing the smaller size plants, which are equally profitable. In Java, Northern Africa and India, too, various species of fibre-producing plants are being cultivated with success.

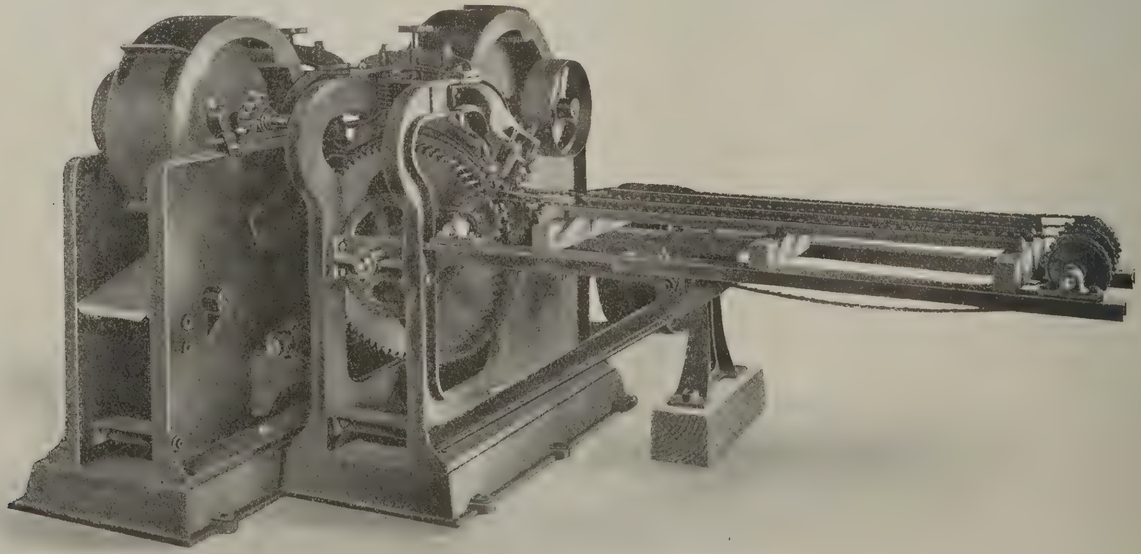
We reproduce herewith two illustrations of machines used in different parts of the world, which, it is claimed, are built on strictly scientific principles, and improved in a variety of ways as trials in the field have proven necessary. The machine No. 21 is used largely in Yucatan, Mexico, and has a phenomenal demand amongst the planters, cleaning 100,000 to 120,000 leaves per day with 40 to 75 horse-power, according to size of leaves. This machine is especially adapted to clean the leaves of the Agave sisaliensis, which produces the sisal hemp. The feeding apparatus of this machine is peculiarly satisfactory; the knives are set into the drums, and are backed by the wheels themselves, which insures a stronger and more even contact when striking the leaves, thus insuring more fibre and less waste. This arrangement supersedes the old system of knives fastened on lugs on the surface of drums. The space between the lugs created a vacuum, which was always troublesome and caused heavy loss of fibre.

The scraping wheels are not the common pulleys used in old-style machines, but are built up with a solid center, which avoids the twisting of fibre in the spokes. The feeding device is entirely new, consisting of a solid disc with a shoe over it, which holds the leaf while it is being decorticated, thus doing away with all chains, which, when used, are found to wear out rapidly and cause much annoyance and stoppage by reason of frequent breakages. The large expense for new links in these chains is thus also avoided.


MACHINE NO. 21, ESPECIALLY DESIGNED FOR TAKING FIBRE FROM SISAL HEMP PLANT.

For plants of smaller and shorter sizes, such as the Lechuguilla, Espadin, Palma pita, and similar fibrous plants, other styles of machines are made. The smallest one, as shown herewith, called "Irene" No. 44, will clean leaves from 12 inches to 40 inches long. This machine is largely used in the northern parts of Mexico and the Bahama Islands.

The manufacturers of these machines, the Prieto Machine Company, Inc., 45 Broadway, New York, who also build a line of crushers, baling presses, etc., claim that they are built with a view to durability rather than cheapness, and that some machines which have worked in the field for two years have not cost $10 for repairs.


NO. 44, FIBRE CLEANING MACHINE.

AMERICAN SYSTEMS OF HEATING AND PLUMBING.

One of the things that impress the American tourist on his first visit to Europe as particularly strange, not to say ridiculous, is the prominence given by many European hotels in their advertisements to the fact that the house has *central Heizung*, or *système centrale de chauffage*—in other words, steam or hot water heat. In America such apparatus is as much a *sine qua non* as a bathroom or a staircase, not only to the remotest country hotel but to every important public or office building and to most private residences nowadays. Twenty-five years ago the American idea in this respect was absolutely unknown, or at least unintroduced, in Europe. Today, in spite of its rapid gain in popularity, those hotels that have introduced one or the other of our systems regard it as so notable a feature of their establishment as to deserve special advertising. A very large and important business with European countries has developed for American manufacturers in consequence of the rapid growth in popularity of our systems, and American export trade in this line has been constantly increasing in a very gratifying manner. Possibly, indeed, such competition has stimulated trade in genuine American apparatus, for not only do American manufacturers offer their goods at even better prices than can their European imitators, but, as might reasonably be expected, manufacturers who have had twenty or thirty years' practical experience in construction, installation and experiment possess innumerable advantages that are quite beyond the reach of rivals who lack such experience and who must pay dearly to gain it.

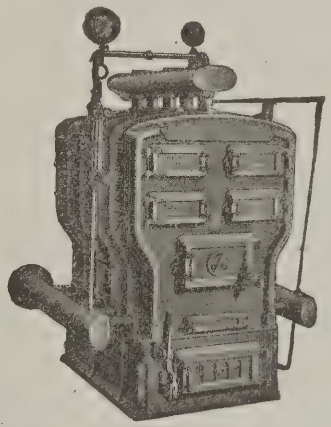
The development of this manufacturing industry in the United States has been extraordinary, yet is based upon sound and logical grounds. Health and comfort in the home and in the office demand improved heating appliances as well as modern sanitary plumbing. Furthermore, owners of old buildings that lack modern equipment find its installation a profitable investment because of the greatly enhanced rental values they thus obtain.

Modern methods of heating are fast improving conditions of life in city and country everywhere. The fireplace is no longer considered of value apart from its cheerful light and pleasant associations. Cumbersome stoves and dangerous hot-air furnaces are being discarded as out of date and supplanted by low pressure steam and hot water heating systems.

For the purpose of illustrating typical apparatus of this sort, as well as supplying an excellent example of the magnitude and importance of the business now under consideration, we have selected the old house of Pierce, Butler & Pierce Manufacturing Company, of Syracuse, N. Y., who date back their establishment almost three-quarters of a century—to be exact, to 1839. For almost a quarter of a century "Pierce" systems of heating have been known in Europe as well as in America. An immense factory, backed by vast investment of capital, has permitted the development under ideal conditions of equipment that both reduces the cost of installation and insures maximum fuel economy. Concentration of interests in one manufacturing plant has contributed also to the betterment of the product and prompt attention to orders. This concern now makes over 300 different sizes and styles of "Pierce" boilers, ships thousands of them every month, and yet is obliged constantly to increase its facilities.

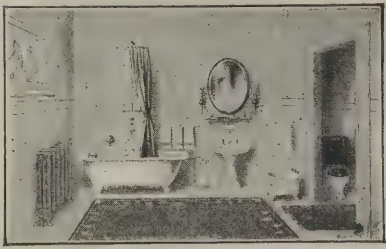
VITREOUS CHINA LAVATORY.

CLOSET FITTED WITH SANITARY WOODWORK.

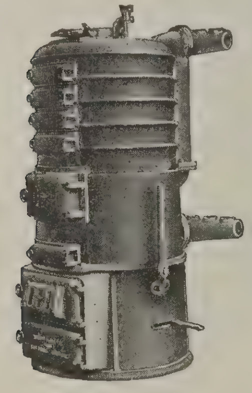

BOILER FOR LOW PRESSURE STEAM HEATING.

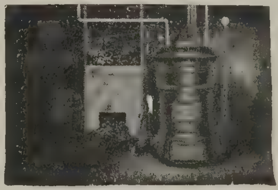
One of the most popular of the Pierce boilers is the "Spence" type for hot water heating, of which more than 60,000 have been sold during the twenty years that have elapsed since its first introduction. The "Spence" is made in four series, with different shaped fire pots and different flue arrangements for the use of different fuels. Style "D" of the "Spence" model is illustrated herewith, and is this year fitted with a unique grate for sifting ashes in the base of the boiler, a notable improvement, characteristic of the constant progress toward perfection which its manufacturers are making.

The combination in one huge plant of the manufacture of heating and plumbing apparatus is a natural and logical proceeding, since the two equipments are as closely allied in all building operations. The Pierce, Butler & Pierce Manufacturing Company have had almost an equal influence upon the evolution of both heating and plumbing goods. Sanitary conditions depend upon sanitary apparatus. Open plumbing is not as desirable as perfect plumbing. In order to perfect the ordinary closet combinations the manufacturers in question have their own sanitary wood-working plant for the improved manufacture of flushing tanks and hygienic closet seats. As nearly all manufacturers use either a washdown with jet or syphon jet bowl, the importance of superior flushing apparatus is readily understood.


A MODEL BATHROOM.

The "Pierce Special" lavatory, shown in the accompanying illustration, is not only something new and exceptionally notable but is sure to arouse unusual interest among sanitary engineers throughout the world on account of its qualities no less than because of its moderate cost. Its manufacturers claim that this is the first piece of solid vitreous (china) ware to be cast with bowl and 10-inch back in one piece. It is further claimed that this ware is superior to anything on the market today, being baked through by a patented process and rendered absolutely impervious to water. There is no hard glazed shell to chip away, flake off or peel; in surface and texture it compares with the finest china, is easily cleaned and never stains nor grows yellow with age. Moreover, these "Pierce Special" lavatories are said to cost less than enameled ware in the same sizes.


THE "SPENCE" STYLE D WATER BOILER.


THE "TOURAINE" STEAM BOILER.

The plant and general offices of the Pierce, Butler & Pierce Manufacturing Company are located in Syracuse, N. Y. A well equipped export department gives prompt attention to all foreign correspondence and orders.

Deposits in American savings banks show a complete record from 1820 to date. In 1820 they amounted to one million dollars, speaking in round terms; in 1850 they had reached forty-three millions, in 1875 924 millions, in 1900 two and one-third billions, and in 1906 three and one-quarter billions; while the number of depositors, which in 1820 was only 8,635, was in 1850 251,354, in 1875 2,359,864, and in 1900 6,107,083 was in 1906 8,027,192, or nearly a thousand times as many as in 1820, while the deposits were more than 3,000 times as much in 1906 as in 1820.

TRADE PUBLICATIONS.

LUBRICATORS.—The 1907 catalogue of the Detroit Lubricator Company, Detroit, Mich., deals particularly with sight-feed lubricators, but in addition to these shows a number of other specialties put out by the company.

POWER BROOM MACHINERY.—A neat catalogue reaches us from Lipe & Walrath, Syracuse, N. Y., descriptive of their power broom machinery. Broom sewing machines, broom winders, broom corn sizing machines and others are illustrated.

MOTOR CARS.—"Reo" motor cars are attractively displayed and their important features clearly brought out in a unique little catalogue just issued by their manufacturers, the Reo Motor Car Company, Lansing, Mich. All of the company's 1907 models are illustrated and described.

TRACK SUPPLIES AND RAILWAY MATERIAL.—One of the season's most complete catalogues dealing with railway supplies is being distributed by the Buda Foundry and Manufacturing Company, of Chicago, Ill. The work comprises 330 pages, and is profusely illustrated, many new departures in railway equipment being shown.

DUMP WAGONS.—Catalogue No. 268, issued by Studebaker Brothers Manufacturing Company, South Bend, Ind., treats of dump wagons, street sweeping machines and special vehicles. A new product shown, which the company states has many improved features over other inventions of this character, is a contractor's bottom dumping wagon.

JEWELRY, SILVERWARE, ETC.—The new catalogue recently brought out by John C. Pierik & Co., Springfield, Ill., is undoubtedly one of the most complete jewelry catalogues issued this season. The line shown includes diamonds, watches, jewelry, silverware, leather goods, cut glass, novelties, etc., and hundreds of illustrations are interspersed throughout the book.

PHOTOGRAPHIC SUPPLIES.—The latest publication of the Anthony & Scovill Company, of Binghamton, N. Y., is a catalogue of general photographic cameras and supplies for the professional, the amateur and the photo-engraver. It covers a complete list of photographic supplies, with many illustrations, and is a handy reference book for dealers and all others interested in photography.

PASSENGER LOCOMOTIVES.—"Eight-Wheel Type Passenger Locomotives," a pamphlet recently issued by the American Locomotive Company, of New York, illustrates and describes different designs of eight-wheel or American type passenger locomotives. It contains illustrations of twenty-five different designs of eight-wheel type engines, the principal dimensions of each design being given.

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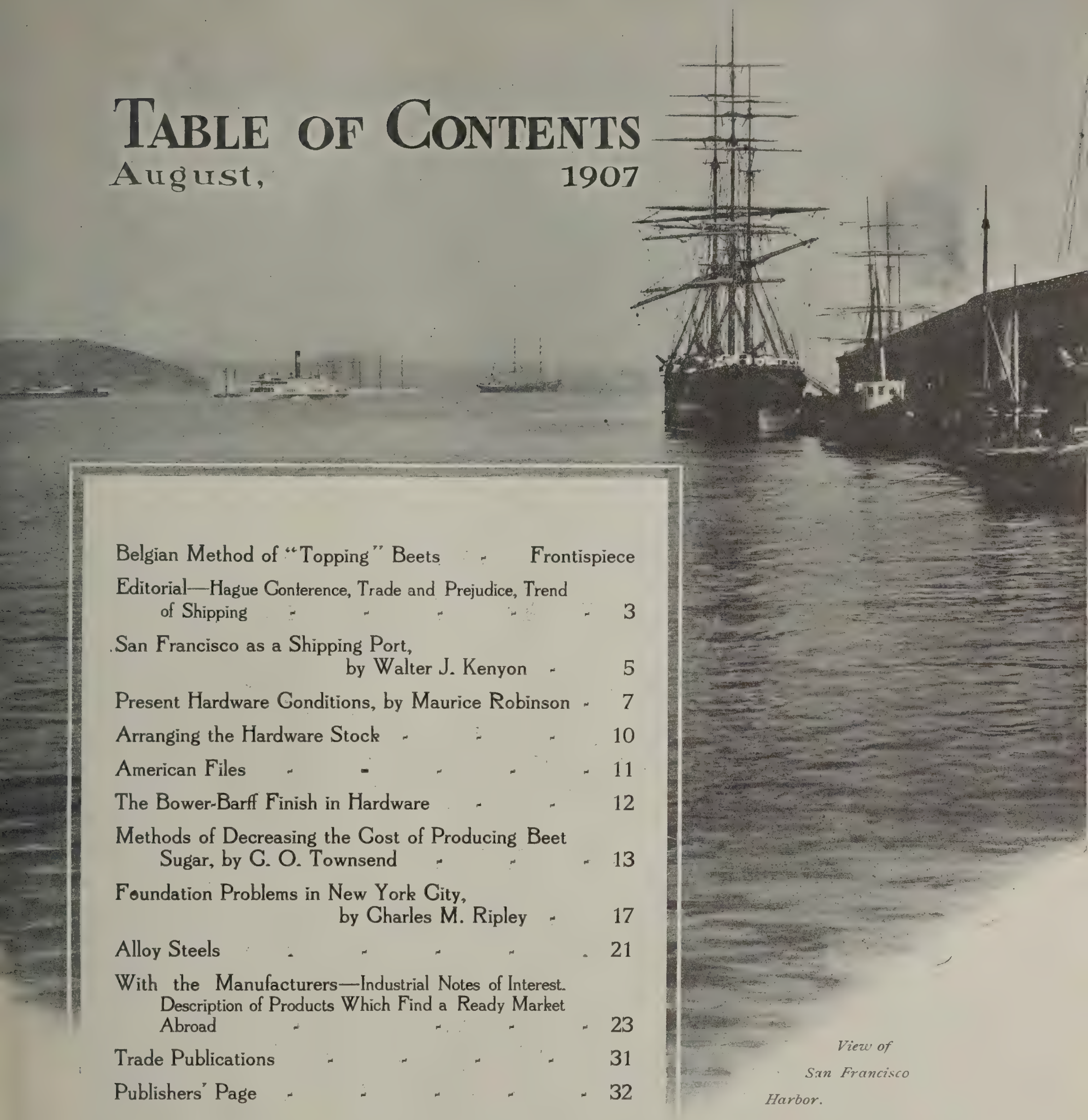

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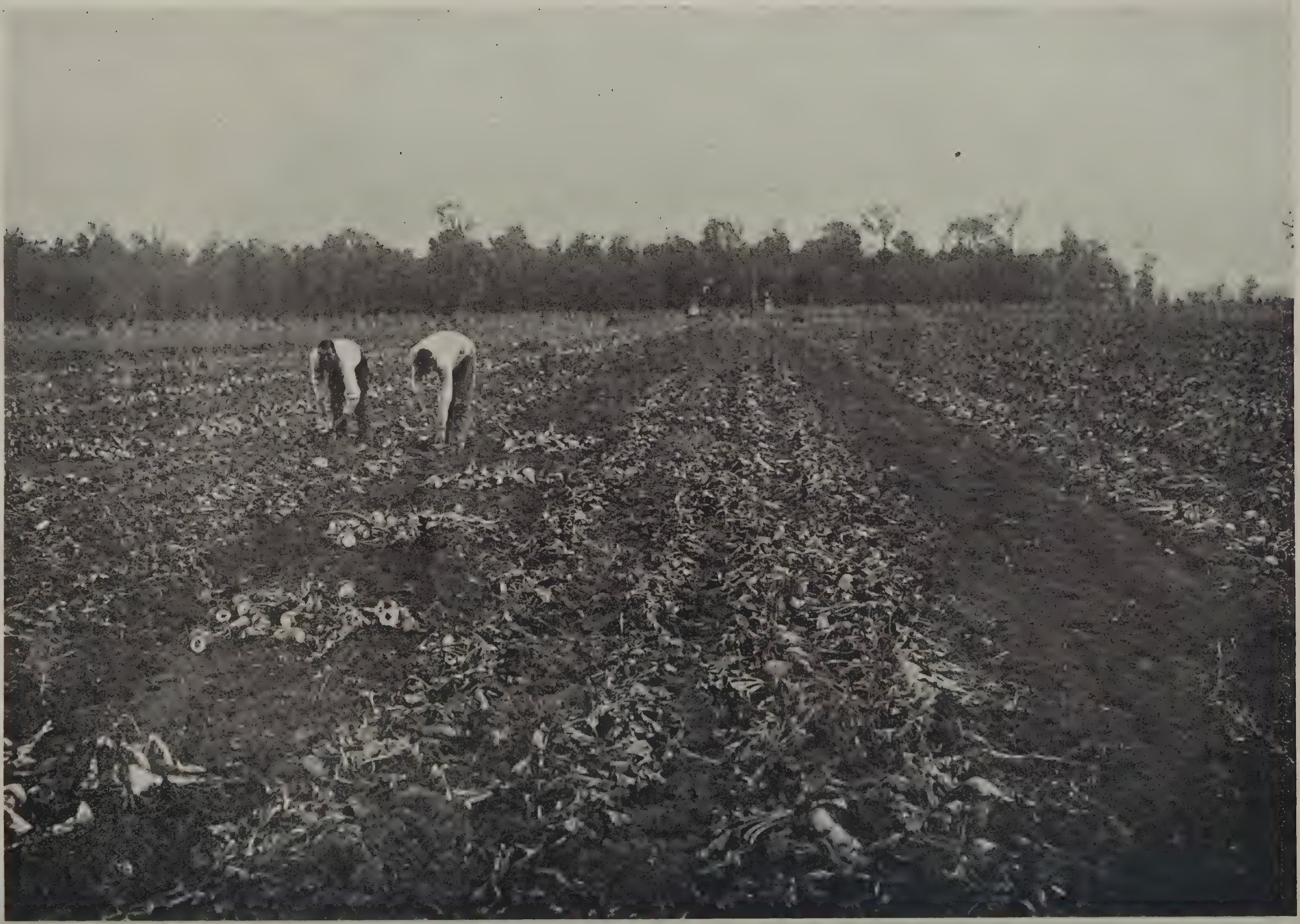
View of San Francisco Harbor.

Subscription rate to any part of the world $2.00 a year, American Gold, or its equivalent in any other currency. Single copies 20 cents.

ring the twelve months ending with August, 1907, 211,000 copies of the AMERICAN EXPORTER were printed and circulated—an average of 17,583 per month.



BELGIAN METHOD OF "TOPPING" BEETS FOR THE SUGAR FACTORY.

These workers economize time and effort in separating the tops from the roots. (See page 13.)

AMERICAN EXPORTER

EDITORIAL

The AMERICAN EXPORTER is both an independent and impartial trade journal. Its publishers have no connection with any manufacturing concern, export house or other business except publishing and, hence, have no outside interest to serve. The editorial management is separate and distinct from its business department.

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HAGUE CONFERENCE.

HON. JOSEPH H. CHOATE,

Delegate from the United States to the Hague Conference.

Widespread attention was attracted by Hon. Joseph H. Choate's proposal, on behalf of the United States, at the Hague Peace Conference, that all private property at sea should be exempt from capture in war time. His strong speech in favor of this proposal has been one of the most notable events at the Conference.

All engaged in international trade, whether importers or exporters, regret that the Conference voted against this measure, since the law of capture and confiscation now remains precisely as before.

It was to be hoped that Mr. Choate's efforts would have resulted in a change, for, from the standpoint of the trader, there is something peculiarly unjust in the rules of war which permit the capture and confiscation of merchantmen and their cargoes. The advocates of the law argue that it is necessary, and that private interests must give way to public policy, no matter at what cost.

Sooner or later the movement which Mr. Choate started will have result. His aim is for the advancement of peace and of the interests of the family of nations. Unfortunately it is apparent that politics has more influence with the delegates to the Conference than the desire for peace, and proposals meet defeat on that score.

Despite criticism and disappointment, however, the Peace Conference is not without accomplishment. In time results of the utmost value in establishing stability of political and trade relations are bound to be attained.

SECRETARY ROOT IN MEXICO.

Of much importance to the commercial relations between Mexico and the United States will be the forthcoming visit of Secretary of State Root to Mexico. President Diaz, of the Republic of Mexico, has long shown a most friendly and liberal feeling toward his neighbor of the North, and he has done much to bring the two republics together for their mutual advantage in trade. He has arranged to personally entertain Secretary Root at his home during the visit to the City of Mexico, an unprecedented honor. Secretary Root's visit to South America has already borne fruit, and similar good results are certain from his trip to Mexico.

TRADE AND PREJUDICE.

To what extent foreign trade is affected by international prejudices is a subject which statistics do not illumine, but which offers food for careful thought and study. The ideal condition of trade between nations, one to which the world is nearer today than ever before, is one in which each country shall exchange with other countries the products each is best able to supply the other, absolutely regardless of political alliances, social and national prejudices and other extraneous considerations—a fair exchange based on the best goods at the best price.

While we seem approaching such a perfect state of world commerce, we are occasionally set back by causes arising in prejudice and ignorance. For instance, we note in British trade journals the statement that the unrest in India has resulted there in a partial boycott of British goods.

There are scandal mongers in a national sense, as well as a social, and if the world listens to their stories some temporary loss of prestige results, with an attendant prejudice which extends to commerce. An injustice was done both the United States and Japan by the sensational efforts which unscrupulous journalists in both countries made to show a misunderstanding between the two nations.

By putting two and two together these writers made more than four, and during a period of a week or so attracted considerable attention to their dire predictions. The false basis of their rumors was clearly shown by the suddenness with which the excitement subsided, leaving hardly a ripple behind.

As a matter of fact, America has the highest feeling of friendship and admiration for Japan, and no country has shown a greater interest in, and sincere encouragement of, Japan's rapid advance in the past ten years. We believe that Japan has a like friendly attitude to this country. Certainly no boycott of American goods is apparent. On the contrary, the commercial relations between the two are becoming still more intimate than before.

The enthusiastic reception which General Kuroki and

Baron Yamamoto received on their recent visits to this country, and the heartiness of their responses, showed conclusively the cordial relations between the two countries.

The unpleasant incidents in San Francisco which gave rise to the tempest in a tea pot are regretted by all thoughtful men, but to strive to attach an international significance to them is absurd. The incidents were purely local, not representative of the State and the country, and took place in a community in an abnormal state owing to the great calamity from which it is slowly recovering.

TREND OF SHIPPING.

Ports on the southern, western and northern borders of the United States are steadily increasing their share in both the import and export trade, while, conversely, the percentage of the trade passing through ports on the Atlantic seaboard is decreasing. In 1897, 83½ per cent. of the imports into the United States entered through Atlantic ports, while in 1907 the share entering through those ports will be about 80 per cent. In 1897 about 69 per cent. of the exports passed out of the country through Atlantic ports, while the figures of 1907 will show but about 57 per cent. of the exports of the country through those ports. These figures are based upon the records of the imports and exports by ports for the eleven months ending with May, as shown by the official report of the Bureau of Statistics of the Department of Commerce and Labor.

Comparing the figures of 1907 with those of 1906 (the figures for the closing month of the present year being an estimate based upon the known record for the month of May), Atlantic ports show an increase of but 17 per cent. in imports, as compared with the immediately preceding year; Gulf ports show an increase of 18 per cent., Mexican border ports an increase of 6 per cent., Pacific ports an increase of 40 per cent., the northern border ports an increase of 12 per cent. and the interior ports an increase of 20 per cent. In exports Atlantic ports show an increase of but 1 per cent., Gulf ports an increase of 30 per cent., Mexican border ports an increase of 17 per cent., northern border and lake ports an increase of 12 per cent. and interior ports an increase of 24 per cent., while Pacific Coast ports show a decrease of about 10 per cent., this reduction in exports through Pacific Coast ports being chiefly in exports to Asia, which fell in 1907 about 14 million dollars below those of 1906.

A more accurate view of the trend of the import and export trade is obtained by extending the comparisons over a longer period of time. Comparing conditions in 1907 with those of 1897, the gain in imports is apportioned about as follows: Atlantic ports, 79 per cent.; Gulf ports, 220 per cent.; Pacific ports, 111 per cent.; Mexican border ports, 337 per cent.; northern border and lake ports, 118 per cent.; interior ports, 180 per cent., and for the country as a whole, 90 per cent. In exports the relative increases are as follows: Atlantic ports, 46 per cent.; Gulf ports, 163 per cent.; Pacific ports, 56 per cent.; Mexican border ports, 193 per cent.; northern border and lake ports, 211 per cent., and for the United States as a whole about 80 per cent.

This drift of the foreign trade away from the Atlantic ports and toward the ports on the southern, western and northern borders occurs more largely in exports than in imports, and is due in part to the fact that a much larger share of the grain and cotton exported now finds its way to Europe via the Gulf, Pacific and northern border ports than formerly, and to the further fact that the exports to the Orient, which have increased rapidly during the decade, pass chiefly out of the Pacific Coast ports.

GERMAN VIEW OF EXPOSITIONS.

The German Commercial Union (Handelstag) has sent out a circular letter to the German chambers of commerce in order to learn their views with reference to a world's exposition, to be held at Berlin in 1913 or other year of the coming decade.

In answer to this the chamber of commerce at Mayence has recently adopted the following resolution, which seems to voice the opinion generally entertained in Germany concerning world's fairs:

"The chamber of commerce has resolved to answer that it cannot recognize the holding of a world's exposition at Berlin in the year 1913, or in some other year of the coming decade, as in the interest of Germany's industries and commerce; that it deems it more advisable, instead of general world's expositions, to organize for all products of human activity international expositions of a special industry, as such only can have the effect of fructifying and stimulating the industries and trades."

The chamber is therefore of the opinion that from its district no substantial participation can be expected in a general world's exposition, but that, on the other hand, it could be expected under all circumstances in well organized international special expositions, provided they do not succeed each other too quickly.

OUR PUBLISHERS' PAGE.

We would call the attention of our readers to a new feature of the AMERICAN EXPORTER, the "Publishers' Page," which this issue will be found on page 32. We hope through that page each month to get into closer touch with our readers, the vast majority of whom are far removed from our publication offices. A journal is dependent for its success upon its readers, and it is our wish to make the relationship between reader and publishers as intimate as possible. Much will be accomplished by this direct talk each month to the readers. In return we would ask that they reciprocate by giving us suggestions as to phases of American manufacture concerning which they desire information, and possible additions to the editorial policy which would make this paper of further value in the foreign trade field.

SAN FRANCISCO AS A SHIPPING PORT

The Importance of the City by the Golden Gate in Relation to the World's Commerce—Unrivalled Natural Resources

BY WALTER J. KENYON

PASSING through the Golden Gate go vessels to all parts of the Orient, to South Africa, to Alaska and its gold fields, to South America and around the Horn to the Occident.

No city of America has so many relations with foreign cities as has San Francisco, and it is beyond doubt the most cosmopolitan city in the country, for here all nations meet.

The world over, San Francisco, the city by the Golden Gate, is familiar to men, through its romance, the history of its pioneer days and sudden rise to importance and wealth in the wake of the discovery of gold, and its virtual dominance of the whole Pacific Coast of the United States as a shipping point. To all the four corners of the earth run important commercial, social and political connections from San Francisco. No traveler to the New World counts his visit complete till he has walked up famous Market street. Throughout the Orient and Australasia 'Frisco is constantly on men's lips and recurs again and again in their business correspondence. No American but looks upon a trip to 'Frisco as something to be greatly desired and long cherished in his memory.

It has been well remarked in discussing San Francisco's loss by the great earthquake and fire of a year ago—a loss estimated at $500,000,000, of which $180,000,000 was covered by insurance—that the ultimate sources of her prosperity remained to her and could be removed by no conceivable natural or mortal agency. These imperishable assets pertaining to the city are four in number: the unsurpassed harbor, a land-locked marine area within the famous Golden Gate of 67 miles in length and as much as 12 in width, with deep water anchorage for all the merchant navies of the world; an extensive and remarkably productive interior region, tributary solely and absolutely to that harbor, and logically implying a commercial metropolis upon its shores; an outlook upon the earth's vastest ocean, and a virtual monopoly of harborage for a thousand miles of coast from San Diego in the South to Portland in the North; an equable and stimulating climate conducive to all-year activities in all lines of trade and commerce.

Two navigable rivers give ingress from the Bay to the extensive valley lands of the State, where on one of the most fertile soils in the world vast quantities of fruits, vegetables and grains are raised, and a superb salt water channel a mile in width, the Golden Gate, affords a world's highway to the sea. Here are the terminals of the overland route and the Southern Pacific line from the East and North. The great commercial port of San Francisco is the inevitable product of these geographic conditions. And whatever be the future of the human race, whatever dynasties and régimes may come and go, so long as there is commerce and industry, and so long as the ocean remains the highway between continents, there must remain a great metropolis at the Golden Gate.

San Francisco's immediate field of trade is this: the Oriental populations, inclusive of Japan, China, Korea and Indo-China, numbering roundly 500,000,000 beings. Of this aggregate, 350,000,000 in the territories contiguous to the Pacific sea front of Asia may be estimated as a present field of consumers, and the remainder as potential, to be included as our commercial development proceeds The 300,000,000 of British India, the Straits Settlements and adjacent lands, although favoring British and European trade to some extent, are an attractive possibility; and an equal suggestion for the future is held out by the Austral populations and those of East Africa. Returning now to our own hemisphere, we find 15,000,000 of ready consumers among the Spanish-American republics, from Mexico to Chile, fronting on the Pacific.

From a stereograph copyrighted 1907 by Underwood & Underwood.

LOOKING UP MARKET STREET.

View of San Francisco's main business artery, showing progress of reconstruction.

The completion of the Panama Canal will affect San Francisco as a distributing center in two ways. It will encourage the Atlantic ports in a struggle for the trade of the Pacific basin, but with San Francisco lying thousands of water miles nearer to Yokohama than does New York, the former will retain a telling advantage. For the South American west coast trade the advantages will be about equal, and the Mexican and Central American ports will remain most accessible to San Francisco. On the other hand, the Canal will bring Rio Janeiro, Buenos Ayres and the east coast ports many thousands of miles nearer to the Golden Gate than they are at present. On the whole, with the probable future of American export trade in view, the Canal project is more likely to increase than to diminish the movement at San Francisco's wharves. Asia is far and away the most important figure in San Francisco's exporting trade, having taken from that port in the year ending June 30, 1906, $24,011,172 worth of domestic goods. Europe follows, with $5,071,647; and Oceania is a close third, with $4,882,635. Then follow the foreign lands of North America, with $3,333,109. South America took $854,183 worth, and Africa only $25,492. These figures omit San Francisco's transhipment of foreign goods and exports to American non-contiguous territory.

In the list constituting San Francisco's export trade cotton and cotton goods form the largest single item, amounting to $11,086,233 for the year named. The table shows the other important items, in money terms:

Grain, flour and breadstuffs	$3,737,088
Vehicles and machinery	4,200,227
Cotton and cotton cloths	11,086,233
Fish	2,152,598
Fruit, dried and green	2,677,510
Hardware and tools	1,086,940
Meat products	1,407,028
Leather, shoes, etc.	2,372,713
Petroleum products	1,033,061
Tobacco products	1,013,495
Lumber and products	968,550
Miscellaneous, including foreign goods transhipped and goods to American non-contiguous territory	8,179,828
Total exports from San Francisco	$39,915,269

The total foreign trade of San Francisco for the year ending June 1, 1906, amounted to $84,348,540. This was 2 and 84-100 per cent. of the entire foreign trade of the United States, and more than one-half of that of the Pacific Coast.

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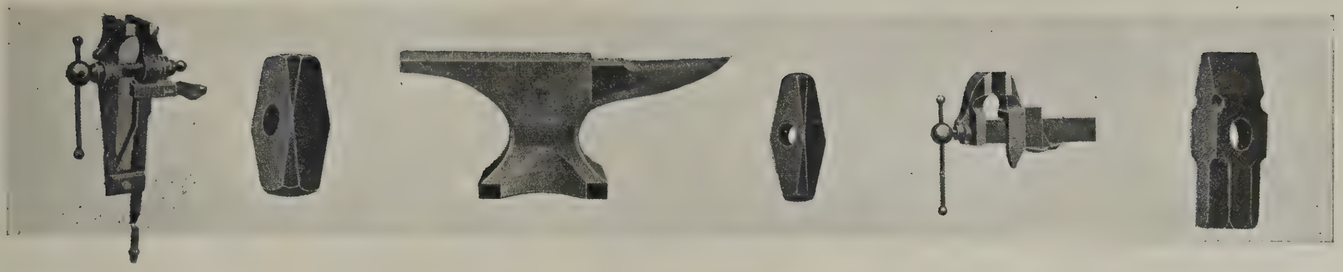
ALCATRAZ ISLAND, SAN FRANCISCO BAY.

All outbound and inbound vessels pass this island, near the Golden Gate.



PRESENT HARDWARE CONDITIONS.

Unprecedented Prosperity of the Industry on a Sound Basis—Modern Methods of Marketing the Product—Growth in Popularity of American Goods.

BY MAURICE ROBINSON.

THE American hardware world is enjoying a period of marked and persistent prosperity in all branches. Factories are running full blast, many of them night and day, order books are filled and business is being done on an enormous scale, amid conditions of great activity. There is no fundamental reason discernible in conditions at present that makes apparent any coming period of depression in the near future. On the contrary the tone is essentially sound, and there are many influences at hand which point to continued prosperity and still greater accomplishments throughout the business.

The manufacturer is frank to admit that for a large portion of this gratifying state of affairs he has to thank the foreign buyer, for the causes of his great success lie not only in the splendid condition of the home market but also in the confidence which the foreign buyer has in the products of the American hardware manufacturing industry.

The great prosperity which this country has enjoyed during recent years in hardware has astonished the most optimistic of manufacturers, and it is unhesitatingly acknowledged that American hardware goods are pre-eminently to the fore abroad, in places heretofore deemed sacred to English and Continental manufacturers. This is due to the standard of the materials, the ingenuity of the American inventor and the energy with which he advertises the merits of his goods.

The discernment of the manufacturers in making equitable prices and the careful buying of the trader are two more points which account for the activity of the industry.

Successful trade means careful buying, as well as quick and profitable selling. Modern conditions of competition demand that the dealer or importer reach out for new lines to introduce and not wait until the manufacturer has solicited his trade. The up-to-date buyer knows the good and weak points of a given line before the salesman arrives. This is due to the vast increase in the use of printer's ink, in catalogues, circulars and the trade press.

Nothing in modern times has grown with more rapid strides than the trade press. Through it the buyer keeps in touch with the trade. A good buyer must possess not only a perfect knowledge of his own market, but must also keep pace with the industries appertaining to it, and by a study and comparison of the markets a good buyer knows when the manufacturer is in a position to quote low prices: for rise and fall of prices are governed not only by the law of supply and demand but also by the price of raw material.

The hardware business nowadays is completely revolutionized from the old days; it has many ramifications and reaches in endless directions. While the aggregate capital has increased tremendously the total number of individual manufacturing establishments has decreased. This is due to the concentration of forces.

Where formerly the head of a concern was president, general manager and office manager all rolled into one, and looked after every branch of the business, today we find a hardware manufacturing plant controlled by a board of directors, the chances being that the majority of the directors have formerly had their own manufacturing plants, but have combined their interests for mutual protection, and in order to improve the quality of their product and increase its quantity. Under these modern conditions the needs of the buyer are looked after as never before. System has taken the place of disorder, and all details of the business are divided under department heads. This gives the president of the firm, or executive head, better opportunities for studying the general condition of the hardware market. His time is not so occupied with the lesser details that he cannot devote much care and thought to the study of how he may better the product turned out by his plant; how he may decrease its cost and how he may market it to the best advantage of the manufacturer and buyer.

Marketing goods has become a science, and there is no large manufacturing concern in America today which does not have a sales manager, whose business it is to look after the marketing of the goods. He controls the advertising, prepares the circulars and catalogues, and is the general in charge of the salesmen traveling on the road visiting buyers. So important is the subject of selling to the manufacturer today that numerous magazines have sprung up in America in the past five years devoted entirely to the science of selling goods, and it is marvelous to note the influence and circulation which they have.

As an offshoot of the sales manager there is the export manager. While this position is a trifle newer, nevertheless it is one which has increased rapidly in importance within the past few years. The export manager, as the title indicates, devotes his entire time and attention to the pushing of his concern's line of goods abroad. He must be equipped with a thorough knowledge of hardware conditious in every part of the world, keep a watchful eye upon his competitors at home and abroad, and do everything possible to awaken the interest of foreign buyers in his class of goods. His position requires special knowledge of geography and of commercial conditions in all parts of the world. His position is the outgrowth of the demand for American hardware in foreign countries. The need for such a man is, however, in part due to the increased tendency in all classes of trade to do away with the middleman and jobber. It may be safely asserted that the foreign demand for American hardware was awakened abroad, and not due at the start to American initiative in striving to enter foreign markets. When foreign buyers first showed a wide interest in American hardware the American manufacturer was at a disadvantage in meeting the demand, owing to his lack of equipment in knowing how to handle foreign business. He found that English export trade was almost entirely carried on through commission merchants and jobbers. Such a state of affairs is now to be noted in the cotton goods industry, America's exports of cotton goods being far below what they should be, because of the greater facilities which England commands through her large number of shipping merchants, who make a specialty of foreign trade in cotton goods, but are not in any sense of the word manufacturers.

This foreign demand for American hardware was immediately gauged at its true importance, however, by American manufacturers and the establishment of foreign sales departments with export managers resulted almost at once. The result of the care which American manufacturers are now taking to meet the foreign demand is that there never was a time when foreign orders were so quickly filled and so carefully looked after as today. The foreign buyer may rest assured that his order to an American manufacturer will be filled promptly, packed carefully and shipped to him with promptness and care. Through the enterprise thus shown, as well as through the superiority of so many American hardware products, due to America's vast resources in iron and steel and to the fact that so many of the best class of foreign workmen have come to America to seek the opportunities which this rapidly increasing country offers them, American hardware has now entered into even such sacred places as Sheffield and Elberfeld. No one would have dared prophesy thirty years ago that such a state of affairs would ever have arisen.

Our British cousins are discussing with considerable eagerness America's invasion of the hardware field, considered from an international standpoint. Happily, they take the stand that the trade is so vast that there is room for all three countries—America, England and Germany. Indeed, in such an age of vast commercial expansion and in a period when the marvels of invention are reaching to the farthest corners of the world, it would be idle to take any other standpoint.

The present trend of manufacturing and commercial thought is toward concentration and the elimination of ruinous competition. It is only one other phase of a universal trend of thought, which is also indicated by the present Hague Conference, the recent Peace Congress in New York and the method of settling labor troubles by arbitration.

In this connection is to be noted that recently a large number of leading hardware manufacturers of the United States went on record as being very strongly in favor of a revision of the national tariff, giving foreign manufacturers a better reception in America and asking for similar concessions from abroad. This shows a spirit of friendliness and a broad gauge attitude.

International trade is a necessity to the progress and peace of the family of nations. The United States is fitted, through her natural resources and manufacturing enterprise, to furnish her sister nations with vast quantities of the best in manufactured products, such as hardware, tools, saws, etc. In return she is in the market to buy millions of dollars' worth of goods and raw materials which she has not at hand.

While it is not the purpose in this article to give a bewildering array of statistics, it is pertinent to note that the foreign trade of the United States for the fiscal year ended June 30 last, according to a bulletin issued by the Bureau of Statistics, aggregated $3,315,352,110, for the first time passing the three billion mark, and exceeded that of the previous twelve months by $344,825,170. Imports comprised $1,434,401,092 of the total, and increased $207,838,646, while the exports, valued at $1,880,851,024, gained $136,986,524, leaving a balance of trade in favor of the United States for the twelve months of $446,449,923.

The year was the first in the country's history when neither the imports nor exports fell below $100,000,000 in any month, the imports for December amounting to $134,349,760, being a high water mark for shipments, and the exports for the same month, valued at $190,399,977, were exceeded only by those of December, 1905.

That hardware is responsible for a huge share in this vast aggregate of values exported is shown by the fact that of the 1,886 millions of dollars' worth of exports in 1907, manufactures ready for consumption, under which head comes hardware, represented 470 millions—25 per cent. of the total exports.

The following table will give the reader some idea of the gain during the past year over 1906 in American hardware exports:

United Kingdom on builders' hardware, gain of $226,811.

Germany on locks, hinges, saws, tools, etc., gain of $93,132.

France on tools, watches, clocks, etc., gain of $622,000.

Asiatic Turkey on hardware, nails, tools, a gain of $30,000.

Japan on nails, gain of $201,632.

Argentina on builders' hardware, gain of $54,691.

Central America and British Honduras on locks, hinges, saws, tools, etc., gain of $16,842.

Brazil on all classes of builders' hardware, $76,899.

Chinese Empire, $40,260.

Cuba, gain of $22,793.

British Australasia on builders' hardware, gain of $222,519.

Statistics from many countries are not available, but the following authentic comments attest ipse facto the great development attained by the American manufacturer. Consul-General Philip C. Hanna reports: "The hardware business of Mexico has a large lead in American goods. Nearly all shelf hardware comes from the United States. The American tools are found to be superior to those brought from any other country."

Consul-General Wm. F. Wright reports from Munich (Bavaria): "Without doubt American wares are growing in popularity, and it is due to a better understanding of general business conditions."

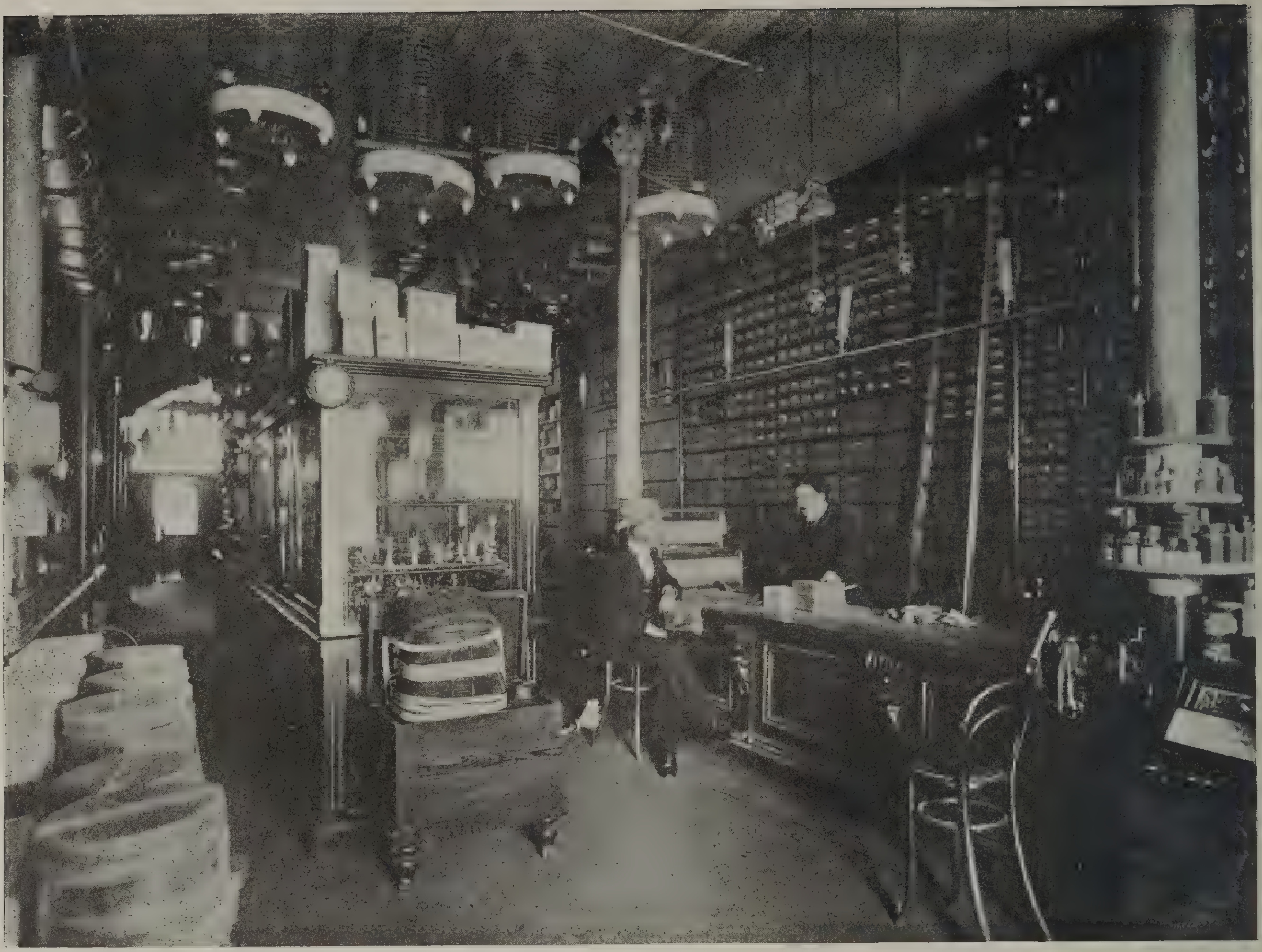
Consul C. H. Daniels, from Sheffield, England, reports: "Cutlery firms have done a better business than ever before with the United States."

Special Agent Harvey R. Durvill reports from Queensland, Australia: "Certain hardware and tools of American make are firmly established in the markets of Queensland. It requires only the maintenance of their standard to prevent competing lines from obtaining a foothold."

Special Agent W. A. Graham Clark writes from Burma, India: "American tools are well liked and in some lines are much preferred to the English. The total imports of tools increased from $22,557 in 1901-2 to $49,463 in 1905-6, and the importations from America increased from $963 to $6,157."

Consul A. J. Lespinasse, of Tuxpam, Mexico, reports that the importations of American hardware the past year amounted to $8,235, which almost equals the value of imports of all sorts of all other countries to Tuxpam.

Consul John H. Snodgrass, of Pretoria, writes: "In hardware, cutlery and agricultural supplies the United States still leads."



CLEVER UTILIZATION OF SPACE.

How Ashby, Bergh & Co., of Christchurch, New Zealand, make good use of available space. Numerous lines of American goods are included in this comprehensive display.

ARRANGING THE HARDWARE STOCK.

Competition in all lines is now so keen and brisk that no careful hardware merchant will let his efforts to be at the top of the heap cease with the careful buying of his goods and attractive advertising. Every such hardware man realizes the value of having his store attractive in arrangement and clean and neat in appearance. As one man put it at a recent convention of hardware merchants, "There are thousands of hardware stores today that are as clean and neat as a jewelry shop." One reason he gave for this welcome change from former conditions of chaos and disorder was that so much hardware buying is now done by women. However dull and lacking in the artistic one may consider a hardware store to be under normal conditions, yet the merchant can no longer afford to fail to make his store attractive to the prospective customer. It is necessary to please the eye of the buyer.

First of all a handsome and artistically arranged window display, showing a modern line of goods, clean and bright, will make a valuable impression on the passer-by. He will study the display of such a window when he would not give a second glance to a badly arranged hardware assortment behind a dingy window, dirty and unattractive. Even if he is not in the market for hardware, the sight of an artistic layout will please him, and the first time he needs something in the hardware line the chances are ten to one that he will drop into the store whose window shows a spirit of progressiveness on the part of the proprietor.

Once in the store the customer will be impressed, either favorably or unfavorably, with his surroundings. Neatness, cleanliness and convenience in arrangement of the goods give the customer immediate confidence in the store and its proprietor. Further, these attributes please the eye, make his stay a pleasant one, and incline him to return for future purchases. On the contrary, a store which has the appearance of confusion is an annoyance to the customer. It makes him scorn the whole establishment, spoils his temper and makes him several times harder to please than would have been the case had his surroundings been agreeable. If it is necessary to keep him waiting for a few moments, through stress of business, he has the more time to see the confusion and chaos. The wait does not improve his temper, and, having nothing but unpleasantness to look upon, the chances are favorable to his leaving the store in a bad temper without purchasing anything. Not only does he thus become antagonistic to the store but a vision of the badly managed store is apt to come up in his mind several times during the day, and he is likely to tell his friends about it, and influence them against that shop.

Even in a small shop the careful merchant can arrange his stock so as to make a comprehensive display, yet maintain neatness. There is a decidedly commercial value in the careful arrangement of stock, for a moment gained in reaching the article desired by the customer often results in a sale to other customers in the store, who would have left had there been a long delay in filling the first man's order.

A few hours spent in a careful study of how every inch of space in the store may be utilized to best advantage will pay the proprietor many times over. It is just such points as these which put one store ahead of its neighbor.

In America today the retail hardware merchants of every section of the country hold annual meetings at which they discuss with one another such points as these. The result has been marked, and the same spirit is being shown in other parts of the world, notably Australia, where the progressive hardware man keeps a watchful eye on what his American brother is doing. One means which progressive hardware men are using to increase their sales is the installation of phonographs and other attractive novelties, which tend to bring women and children into the store, as their influence is potent on future sales. Also, by making the hardware store attractive, the merchant educates the public up to a higher regard for hardware stores and dispels the old-fashioned ideas regarding its dullness.

Merchants find it very much to their financial advantage to make their stores as neat and attractive as possible. The effect is far in excess of the effort.

TACOMA'S SHIPPING.

Tacoma, Wash., is rapidly gaining new importance as a Pacific Coast shipping point.

Waterhouse & Co. announce the list of steamers which will ply in the Australian mail service to be established from Tacoma and British Columbia via San Francisco. The first sailing will be in August. The schedule names two well-known vessels of the "Eric" fleet, the Foreric and the Tymeric, and two vessels of the old Ocean Navigation Company fleet, the Oceano and the Yeddo. The Foreric left Newcastle, N. S. W., for San Francisco on June 13. She will take the first of her Australian cargo in the British side, coming thence to Tacoma. From the Sound she will complete her cargo at San Francisco before sailing for Australia. Following the Foreric the Tymeric will visit Puget Sound.

It is said that the Union Pacific Railway system is to establish a line of steamers between Tacoma and the Orient, and the rumor is that the Union Pacific is now arranging for terminal facilities.

These rumors indicate the growing volume of trade between the United States and the Orient.

AMERICAN FILES.

The industry of manufacturing files in the United States has grown to vast proportions, some of the plants having facilities for producing from 30,000 to 40,000 per day each, and for supplying over 3,000 varieties suitable for varied uses.

The coarseness or fineness of a file is designated by certain trade terms: 1, rough; 2, middle-cut; 3, bastard; 4, second-cut; 5, smooth; 6, superfine or deadsmooth. The forms given to files, as well as other shapes and sizes, are almost numberless. Those having cutting edges extending unbroken from side to side are called "floats" or "single-cut" files, and those having two sets of such edges, crossing each other at an angle, are called "double-cut." The effect of such crossing of edges is to produce points of teeth rather than true cutting edges. Files are made in all sizes, which vary from the watchmaker's files, being very delicate and measuring less than an inch in length, and having a thickness not greater than that of a coarse bristle, to the large wood and iron workers' rasp, which measures as great as 4 feet in length and 5 inches in width.

Files are usually made of very best material, and great care is taken to select steel that is uniformly and highly converted. The first operation is to forge the steel into blank forms of the approximate size and shape that the completed file will eventually take, which is done much after the manner that is employed in all small work in steel, the smith taking care not to work the steel at a higher than a blood-red heat. The shapes are given by the use of dies and formers. Special care is taken in selecting fuel (coke) made from coals free of sulphur. The blanks are then thoroughly annealed, after having been forged. The finer qualities are annealed or "lighted" in iron boxes, in which they are embedded in sand. The annealed blanks are next ground into the exact shape demanded, and the scale formed during the antecedent process is removed, leaving a clean and properly formed surface for the operations of the cutter. After grinding the blanks are greased and sent to the file cutter.

The cutting is performed by hand, the tools used consist of odd-shaped hammers and chisels, and anvil and packing pieces of lead or pewter. The blank is placed upon the anvil, which is held secure by a strap that passes over the anvil and forms a loop in which the workman places his foot, similar to the stirrup. The workman then proceeds to cut the file by bringing the chisel in the proper position on the blank and striking it with his hammer, repeating the operations successively until the full length has been covered. The surface of the file being single-cut, or cut in one direction, a second set of cuts is made in the opposite direction, the two sets of cuts forming the angles of the cutting surface of the file.

After cutting the files are then bent into the desired shapes and hardened and tempered. The tong or handle end is then softened by immersing in molten lead.

A careful system of inspection is adopted by the best manufacturers and all defective files are thrown out.

THE BOWER-BARFF FINISH IN HARDWARE.

How This Protective and Pleasing Finish Is Produced—The Gesner Modification—High Cost of the Process.

Recently a hardware clerk became interested in the Bower-Barff finish, and desired to learn all he could of this process of finishing iron and steel goods. His curiosity on the subject elicited the following information from the editor of the *Brass World:*

As produced today, the Bower-Barff finish is a modification of the original practice of George and Anthony S. Bower and Frederick S. Barff. The process which is used at the present time is, in reality, Gesner's method. This is an improvement upon the original Bower-Barff process, and by its use many of the difficulties which are encountered in manipulating the Bower-Barff process are overcome.

The principle of the Bower-Barff process lies in the fact that, when iron or steel is heated to a red heat in an atmosphere of steam, the surface is converted into magnetic oxide of iron (black oxide). In order to successfully operate the method all air must be excluded while the operation is taking place and only steam used. The heating of the iron or steel in an atmosphere of steam is the base of both the original Bower-Barff process and later modifications.

In the year 1880 George and Anthony S. Bower were granted a United States patent for "Coating Iron with Oxide." In this specification the claim is made for the use of carbon dioxide instead of steam as a gaseous atmosphere in which the articles are heated. The iron or steel is heated in a closed receptacle and carbon dioxide gas (carbonic acid gas) is passed in. It is a well known chemical fact that metallic iron at a red heat will reduce carbon dioxide to carbon monoxide and become oxidized to the magnetic oxide. The ultimate effect of Bower's process, therefore, is the same as Barff's.

Bower preferred to work his original method by the use of a mixture of air and carbon monoxide gas, which, in the retort, formed carbon dioxide.

The development of the processes of Bower and Barff brought about their use for producing a black finish upon iron or steel which resists the action of the atmosphere and thus prevents rusting. The Bower-Barff finish of the present is the culmination of these early discoveries.

The Bower-Barff finish can only be produced upon iron or steel. It has a dead black color which is caused by the presence of the magnetic oxide on the surface. The depth of this oxide of iron depends upon the length of time that the articles are treated. The magnetic oxide of iron is produced by heating the articles in a closed retort in an atmosphere of steam. The steam changes the surface of the iron to the magnetic oxide.

At the present time the use of the Bower-Barff finish is confined principally to hardware upon which a durable and lasting black finish is desired. Contrary to the early predictions the process is not extensively used. The cost and difficulty of treating small articles militate against its use in certain lines of work. In others the fact that the magnetic oxide is very hard and apt to scale has prevented its use. When properly done, however, the finish not only protects the iron in an excellent manner but has a pleasing effect. Many imitations of the Bower-Barff finish are possible and are extensively used. The cost of producing the genuine Bower-Barff finish is such that it cannot be used for the cheapest classes of work.

A great difficulty with both the Bower and Barff methods of producing the magnetic oxides on iron and steel is that the oxide is apt to scale off after it has been finished. Gesner seems to have overcome this difficulty, and his process is, in reality, the one which is now employed for the production of the Bower-Barff finish.

The Gesner process consists of heating the article to be treated in a closed retort and admitting steam as in the original Bower-Barff method. This is continued for some time and the steam is finally shut off. A small quantity of naphtha is now allowed to flow into the retort for a few minutes. The steam is again admitted after the flow of naphtha has ceased. The articles are finally allowed to cool and are then removed.

It is the Gesner modification that is now used for producing the Bower-Barff finish.

The Bower-Barff process as practiced at the present time (Gesner's modification) is carried out in the following manner:

1. Preparation of the work by sand blasting.
2. Heating the article in the retort to about 1,000° Fahr. and passing steam into it for a short time.
3. Introduction of a hydrocarbon, such as naphtha, into the retort.
4. Again injecting the steam.
5. Cooling the article to about 800° Fahr.
6. Immersing in paraffine oil.
7. Removing the oil in benzine.
8. Lacquering the article with a flat lacquer.
9. Waxing the surface.

It may be of interest to those who wish to use the Bower-Barff process to know that the original patents of Bower, Barff and Gesner have now expired.

The cost of the process is necessarily high, and this fact has militated against the common use of the Bower-Barff process. Although apparently a cheap process, the length of time that the articles must remain in the retort and the necessarily small output bring the cost quite high. Articles cannot be treated in baskets, as every portion of the surface must be exposed to the action of the steam.

METHODS OF DECREASING THE COST OF PRODUCING BEET SUGAR.

Ways to Economize Lie in Saving Cost of Labor, Increasing Yield, and Selection of Seed Germs.

BY C. O. TOWNSEND,

Pathologist in Charge of Sugar-Beet Investigations, United States Department of Agriculture.

BEETS READY FOR THE FACTORY.

THE first refined beet-root sugar produced in commercial quantity was made about 100 years ago, at a cost of approximately 80 cents a pound. The cost of producing cane sugar was then somewhat higher than that of beet sugar. The amount of raw sugar extracted from the beet at that time varied from 4 to 6 per cent., and the amount of refined sugar obtained was from 1 to 2 per cent. of the weight of the beet. The cost of producing an acre of beets was estimated at approximately $35, while the yield was from 6 to 25 tons per acre. When it is considered that upward of 15 pounds of refined sugar can be obtained at retail today for the original cost of manufacturing 1 pound of beet sugar it must be realized that many improvements have already been made in the quality of the beet, in cultural methods, and in factory operations, all of which have tended to reduce the cost of the finished product.

In this connection it may not be out of place to mention the possibilities of utilizing to greater advantage the by-products of the beet sugar factory. The first beet sugar factory built (1805) manufactured raw sugar, wine, spirits and vinegar. After several years of successful operation the owner of this factory stated that if the sugar paid only for operating the factory the enterprise would still be a success. He further reported that the utilization of the beet leaves and pulp enabled him to double the number of cattle on his farm, and the manure thus produced greatly increased the yield of his wheat. Stockmen are rapidly coming to understand the value of beet pulp as a cattle food, while the possibilities of manufacturing alcohol, fusel oil, vinegar, fertilizers, etc., from the refuse molasses have already been demonstrated. It may be that the ever-increasing demand for cheaper sugar, and the constantly advancing possibilities of utilizing the by-products, may eventually place the manufacture of sugar in that class of industries in which the factories are operated for the sake of the by-products.

One of the most promising lines along which the cost of producing beet sugar may be reduced is that of the improvement of the beet. When one examines the wild beet and notes that the roots weigh but a few ounces each, he cannot help wondering at the large tonnage that was sometimes produced early in the nineteenth century, when according to published reports the yield frequently reached 25 tons of roots per acre. It is true that the average yield was much below this point, but it undoubtedly compared very favorably with the present average yield of beets in this country, which according to obtainable figures is from 8 to 10 tons per acre. It would appear, therefore, that little progress has been made along this line. That the individual roots of the cultivated beet are larger than those of the wild beet there is no question; but it would seem from a study of comparative yields that the larger the root the fewer the beets which can be produced per acre. This is undoubtedly true within certain limits; but, after the most satisfactory relation between the number of beets per acre and the size of the beets has been determind, there are three methods by which the yield of beets per acre may be increased without diminishing the percentage of sugar in the beet: (1) By improved cultural methods; (2) by the use of fertilizers; and (3) by selection.

In regard to cultural methods used with sugar beets our foremost agriculturists do not agree. They are unanimous, however, in regard to the importance of early thinning. Undoubtedly many tons of beets are lost to the farmers and to the factories annually by delaying this important operation. In the use of other cultural methods we are constantly gaining new information through our experiments and through the growers' experience, which must eventually result in an increased tonnage of beets.

Thorough cultivation cannot be too strongly emphasized as a factor in producing good sugar beets. It is a common saying among the Germans that "the sugar must be hoed into the beet." While it is true that the sunshine and the air are the principal factors in sugar production, the cultivator and the hoe are important aids in keeping the beet vigorous and active. At no time in its life should a beet be allowed to cease growing, for if it once becomes stunted it is doubtful whether it will ever make as good a beet as it would have been under conditions of continuous growth.

POLISH WOMEN WORKING IN BEET FIELDS.
They have helped solve the labor problem on American beet farms.

Numerous experiments have been conducted by the United States Department of Agriculture, by the State experiment stations and by growers to determine the proper relation between fertilizers and the sugar beet crop. While there is still much to be learned in regard to fertilizers, there can be no doubt about the benefit to be derived from their judicious use with sugar beets.

The rotation of crops is an important matter in the growing of sugar beets, and while the rotations must necessarily vary in different localities there should always be some green crop in the rotation, preferably a legume, that can be plowed under to furnish humus and to supply at least a part of the nitrogen.

Another possibility of improving the beet is to increase its sugar content. If this is done, even without increasing the size of the beet, a greater yield of sugar per acre may be obtained. When the percentage of sugar obtained from the beet a century ago is compared with the present sugar content of our cultivated beets, it is seen that much progress has already been made in improving the beet in this direction.

If a largely increased yield of beets is combined with a much higher sugar content it is entirely possible to obtain three times as much sugar per acre as is produced on an average at the present time. For example, the present average yield of beets per acre in the United States is about 10 tons, and the percentage of sugar actually extracted and refined does not exceed 12, making the average yield of sugar per acre approximately 2,400 pounds. Yields of more than 30 tons of beets per acre are sometimes obtained, and yields of more than 20 tons are common. From 20 to 25 per cent. of sugar in the beets has been reported so frequently that it is safe to assume that an average sugar content of 18 per cent. is within the limits of possibility. If an average yield of 20 tons per acre and an average sugar content of 18 per cent. could be reached, we would have an average yield of 7,200 pounds of sugar per acre. If this could be realized without increasing the cost of growing the beets, it should be entirely possible for the grower to furnish the raw material to the factory at a somewhat lower cost than is at present practicable. This is the first important step toward reducing the cost of sugar production.

One of the most important factors in producing a beet rich in sugar is the proper selection of beets for seed production. This is the seedsman's problem, and is, under the present methods of beet seed production, entirely outside the province of the grower of factory beets. However, the sugar content of beet roots depends to a very great extent upon the soil and climatic conditions.

The theory that sugar beets will ruin the land has long since been exploded. The best crops of sugar beets and other farm products are found on many of the farms where sugar beets have been grown longest. This is in part due to the fact that good farmers have become better farmers through their experience in growing beets. Proper rotation of crops, good cultivation and the judicious use of fertilizers are the factors that keep the land in good condition and enable farmers to obtain the highest possible returns for the labor and money invested. The situation in regard to land values, so far as they relate to sugar beets, may be stated as follows: Inasmuch as sugar beets require the best quality of soil and demand that it shall be in the highest state of cultivation to produce the best results, sugar beets must remain a comparatively high priced crop, and any attempt to reduce their price must result either in producing an unsatisfactory crop or in eliminating sugar beets from the system of crop rotation in many localities.

A factor which up to the present time has had a tendency to increase rather than to diminish the cost of sugar beet production is the cost of labor.

An important phase of the labor question should be considered in this connection, and that is the amount of labor required in growing an acre of beets in order to obtain the greatest profit from the crop. The average cost of growing and harvesting beets in America at present is estimated to be approximately $30 per acre. It would undoubtedly be poor economy to lessen the cost of growing beets by reducing the amount of labor per acre under the present conditions. There are some indications that a still larger expenditure of labor upon the crop would produce a much greater return. For example, several years ago one of the leading agricultural papers of this country offered a series of prizes for the best crop of sugar beets to be grown under certain conditions. One of the winners produced approximately 30 tons of beets on an acre of ground. The total cost of growing this acre of beets was nearly $60. A little reflection will show that a much larger profit per acre was obtained in producing 30 tons of beets on a given area at an outlay of $60 per acre than would have been made by spending $30 in growing the present average tonnage on the same area. From this and other examples that might be cited, the conclusion is obvious that the production of sugar per acre may be increased by increasing the amount of labor per acre in growing the beets.

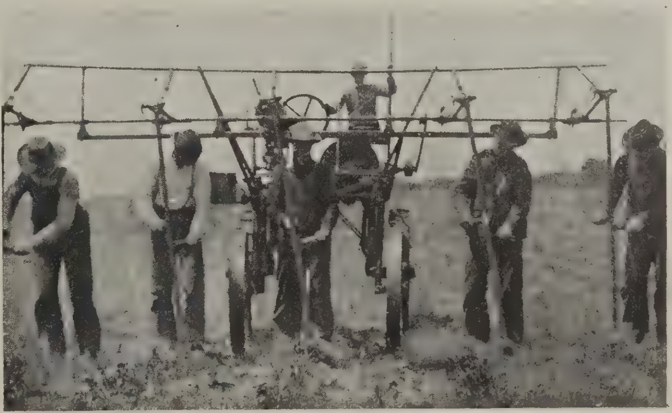
The question of obtaining a sufficient number of the right kind of laborers to grow the sugar beet crop has become one of the most complex and at the same time one of the most important problems in connection with the sugar beet industry in nearly all the beet areas in this country.

In some localities no difficulty is experienced in obtaining a sufficient number of suitable laborers throughout the season, especially in those sections where the farms are small and the country is thickly settled with good farmers. Under these circumstances the individual farmer is usually found growing a small acreage of beets —frequently not more than from 3 to 10 acres—which he is able to care for with his own family, with possibly some assistance now and then from his neighbors. In this way beets are grown more satisfactorily as regards labor than in any other.

If the sugar beet area is located near one or more large cities a considerable portion of the temporary labor comes from that class of city residents who have no permanent employment and who are willing to go out and work in the fields. This is especially true of certain members of the foreign population, both men and women, who often make excellent farm hands. Most of these laborers insist upon returning to their homes in the city at the close of the day. Numerous instances might be cited of Polish women who walk from 2 to 4 miles in the morning in order to do their day's work of thinning, hoeing or topping beets, or other farm work that their employer may require. At the close of the day they walk back to their homes only to repeat the same operation the next day and each day throughout the season. Some of the employers state that this is the best class of labor that they are able to obtain on their farms.

In one community another plan has been adopted which promises good results. The important point, the nucleus of this plan, is a portable house. The outfit consists of a farmer's handy wagon, the wheels of which are 28 inches in diameter and have a 5-inch tread. There are a laundry stove, cooking utensils, woven-wire folding cots, mattresses and blankets. Each house will accommodate from two to five workmen, and costs about $75. The laborers occupying one of these houses contract to do the hand work for several beet growers at a price ranging from $18 to $21 per acre, depending upon the number of hoeings, etc., included in the contract. The agreement is that when they have finished one operation, such as thinning, for one farmer, he will take his team and haul the house to the next farm. This house is portable, not only in the sense that it is on wheels but also from the fact that it is capable of being taken down and shipped on the cars. In this way it is easily shifted about from community to community, to the place where it is most needed.

The laborers using these houses are mostly Belgians, who seem to be very satisfactory in the beet fields in most instances. They are tireless workers, and when employed by the acre often utilize every moment of daylight in caring for the beets under their contract. Their method of topping beets is one that seems to be peculiar to themselves, and is very rapid. The beets are pulled and thrown in rows, with the tops all one way, and then, in a bent position, as shown in the frontispiece, the laborers go up and down the rows, cutting off the tops and throwing the



MACHINERY ON THE BEET FARM.

Power hoe weeding beets. Manufacturers are devoting much attention to beet harvesting machinery.

beets into piles. The two brothers shown in the illustration were photographed while working on one of their contracts. This year they rented a 40-acre farm and are growing their own beets. It is safe to predict that within a few years they will be landowners and employers of labor.

Commercial beet seed consists for the most part of from two to seven individual seeds welded by nature into one mass. It is evident that plants produced from such a mass of seeds must necessarily be very close together, and thus far no mechanism has been devised whereby the plants can be properly thinned. It is clear, therefore, that if we expect to do away with the hand thinning of our sugar beets it can probably be accomplished only by changing the construction of the seed ball, either naturally or artificially, so that there will be but one germ in each ball. Repeated efforts have been made to break up the seed balls by passing them through various forms of rollers and grinders so that each seed could be planted by itself. The seed coats are so hard that any device that has been tried thus far that will crush or break the seed ball breaks a large number of the seeds and renders them useless.

Efforts to produce single germ beet seed by selection have resulted in several plants yielding upward of 49 per cent. of single germ seeds. In the light of the advance already made it is reasonably safe to assume that this object will finally be accomplished by this means.

Meantime, as the industry grows, there will be an ever-increasing demand for hand labor for thinning the beets. Many growers have not yet learned the importance of early thinning, and consequently they try to do the work with an insufficient force, letting this operation, which should be done within a few days, extend over a period of several weeks, much to the detriment of the yield and consequently to the returns from the crop.

The number of hoeings given a crop of sugar beets varies from two to five. A single hoeing is much less expensive than the single operation of thinning or of harvesting, but the total number of hoeings, if properly done, will cost more than either of the other operations. It is important, therefore, that something be done to reduce the cost of hoeing sugar beets. As already pointed out, it would be poor economy to reduce the cost of hoeing beets by giving them a smaller number of hoeings or by doing the work less thoroughly. On the other hand, there are indications that better beets could be grown if more attention were given to this phase of sugar beet culture. If anything is to be gained over the present method of hoeing beets it must be by means of a machine that will do the work more thoroughly or at a lower cost per acre. A power hoe has recently been invented and successfully used in the cotton fields. Although not yet tried in connection with sugar beets, it would seem from its construction that it could be used to considerable advantage in the beet fields. This hoe consists of a metal disk which may be forced into the ground to any desired depth, and is made to rotate rapidly in a plane parallel to the surface of the ground. The power that causes the disk to rotate is furnished by a gasoline engine, while the movement around the plant is guided by the human hand, as shown in the illustration. It is claimed for this machine that from five to six times as much work can be done per day with one of these hoes as can be done by the same man with a hand-hoe. If this particular implement is not adapted to sugar beet work it will doubtless lead to something whereby artificial power may be used in blocking and hoeing sugar beets.

Several cultivations are necessary in the growing season. The number of cultivations and the depth and distance from the beets that the teeth of the cultivator should operate are moot questions among agriculturists. It is agreed that different conditions require different treatments, and hence the expense of cultivating beets must depend somewhat upon soil and weather conditions. However, the single cultivator has given way to a great extent to the two row cultivator, and recently a four row cultivator has been devised and put in operation, so that the cost of each cultivation is greatly reduced. The initial cost of the four row cultivator is greater than that of a single row cultivator, but the additional outlay is soon made up if there is a considerable acreage of beets to be cared for.

Harvesting sugar beets consists of three distinct operations, viz., lifting, pulling and topping. For many years lifting or loosening the beets has been done by horse power. In some parts of the West steam power is now being used for this purpose. Two kinds of lifters are in general use, one consisting of a side plow, which passes along one side of the beet row and loosens each beet by pressing slightly against it and at the same time plowing it up. The other form might be described as a plow with two points or shoes, so arranged that as they pass along on either side of the beet row each individual beet is caught between the points and lifted slightly, so that it is left perfectly loose in the ground. The beets must then be pulled and topped by hand.

Many forms of beet harvesters have been constructed, but none has come into general use. It is the aim of the inventor of the beet harvester to perform the three operations at the same time. Some inventors aim to top the beet and then pull it, while others maintain that the beet must be first pulled and then topped. If the beets are topped and afterward pulled, there seems to be some difficulty about getting all of them out of the ground. On the other hand, if the beets are first pulled and then topped, considerable difficulty is experienced in topping them correctly, owing to the variation in the size of the beets and the difference in the length and size of the crowns. Some new harvesters are in the field this year, and it is probably a question of only a few years when the harvester in the beet field will be as common as it is in the grain field. The cost of hand work in harvesting beets is from $5 to $8 per acre. It must be remembered that no machine annihilates the cost of any farming operation, but that a satisfactory beet harvester would greatly reduce the expense of harvesting the crop is evident.

FOUNDATION PROBLEMS IN NEW YORK CITY.

How Engineers and Contractors Surmount the Difficulties of Quicksand and Water-Bearing Strata.

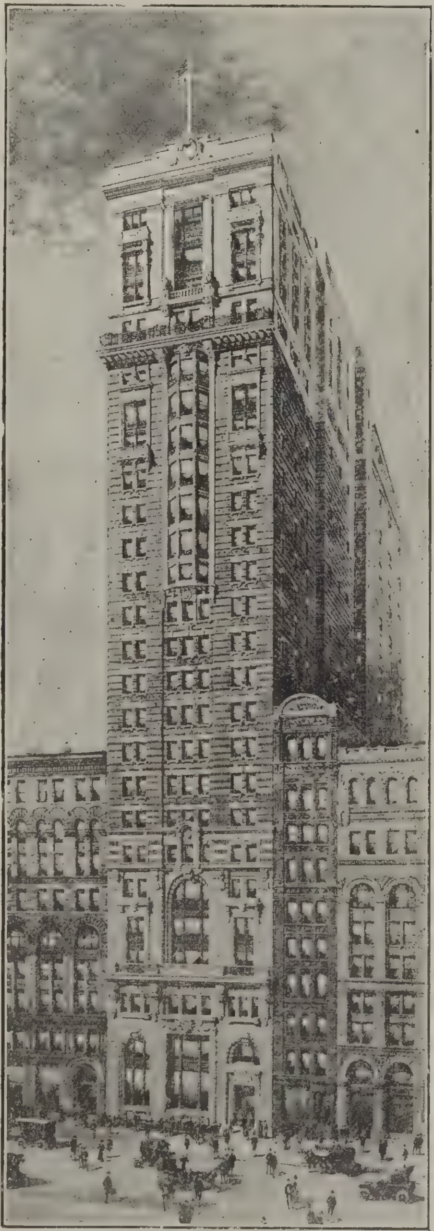
BY CHARLES M. RIPLEY.

THE gigantic increase in the erection of skyscrapers in the "Lower Broadway" section of New York City during the past few years has been made in the face of grave and increasing engineering difficulties. A study of the laying of the foundations for the Trust Company of America, now nearing completion in the financial section of Wall street, will bring out forcibly, first, what these problems are, and, second, how the talent of engineering contractors has been developed by them. Less than a dozen years ago the following conditions would have been considered insurmountable obstacles, making impossible the construction of a twenty-five story building on this site.

As shown in the accompanying plan (Fig. 1), this building is situated between the present United States Trust Company and the Mills buildings. Owing to the prevailing prices of Wall street real estate, every inch of available space must be utilized, with the result that the foundations of the new building must practically "rub elbows" on either side with those of the old.

It is not generally understood that as we approach the southern end of Manhattan Island the bed rock slopes off lower and lower below the surface—so much so that at Wall street it is 80 feet below the curb, and at the Battery between 90 and 100 feet below. It might be mentioned in this connection that the rock appears at water line at about Fourteenth street, and continues rising as we approach upper Manhattan; so that in building projects in this latter portion of the city it is often necessary to blast away a miniature mountain before the site is even down to street level. It is due to this characteristic of New York's geological formation that the excavation for the great Pennsylvania Railroad depot has so often been termed a veritable quarry. In these cases the foundations are supplied by nature.

In striking contrast to such simple foundation problems we have the case at hand. Foundations to be laid to bed rock, through about 80 feet of quicksand and water-bearing strata, which is already heavily loaded by adjoining ten-story buildings. In digging, water and soft mud are encountered but a few feet below the street level, and were this soft muck pumped out or removed by any of the old-time methods more of this fluid material would enter the excavation from either side and the adjoining structures would settle and later collapse. The Foundation Company to which was entrusted the responsibility both of planning and doing this work solved these problems by employing the pneumatic caisson process, in conjunction with the Moran air lock, an invention of their vice-president, Mr. Daniel E. Moran, C. E.



TRUST COMPANY OF AMERICA'S BUILDING.

One of New York's skyscrapers.

The principle of the air lock was used for the underpinning of the adjoining buildings, as well as for the main part of the work. Fig. 4 shows how work was begun even while the old building was being wrecked. Niches about 5 feet above the cellar floor and 5 feet wide were cut in the walls of the adjoining buildings with Crippen electric and Ingersoll-Sargent steam drills at intervals of about 6 to 9 feet. These were carried downward, through the old foundation, and through the sand under the foundation until the water line was struck. Then one 6-foot length of riveted steel pipe, 36 inches in diameter, was jacked down into the sand, thereby employing the weight of the buildings in constructing the new underpinning. A downward opening door was installed at the top of this length, a second length was bolted to the first, and then the second downward opening door was installed, completing the miniature air lock. As shown in Fig. 4, compressed air was supplied to the bottom chamber and the work pushed lower and lower through quicksand or hard pan as successive lengths of pipe were bolted to the top and material excavated. When rock was reached the entire cylinder was filled with concrete, the steel pipe remained and when the steel beams were placed, as shown in the left side of Fig. 4, the underpinning at that point was completed. Twelve of these cylinders support the wall of the Mills Building and eleven that of the United States Trust Company Building, as shown by the shaded portion in Fig. 1.

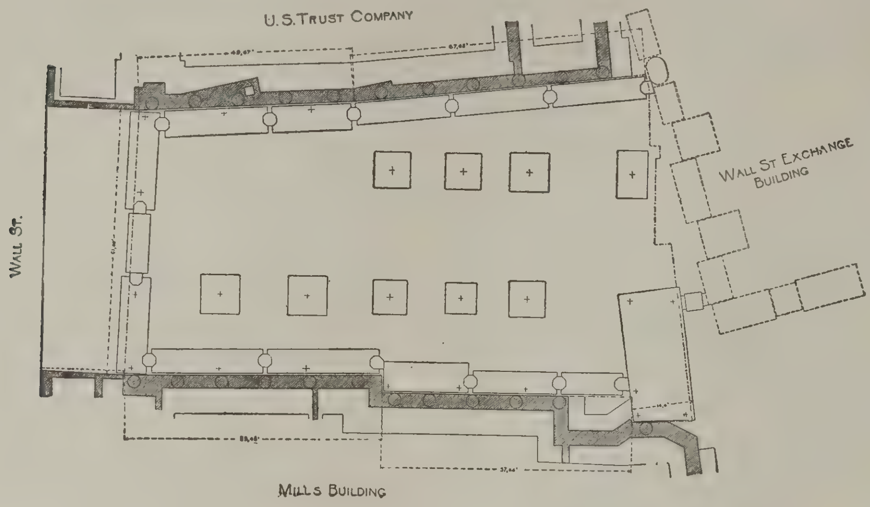


FIG. 1.

TWENTY-SEVEN CONCRETE PIERS

constitute the foundation work proper under the Trust Company of America Building. The remarkable speed with which these piers were sunk to bed rock was made possible mainly from this one fact: The Moran air lock allows the material excavated in caisson to be hoisted to the open air in one continuous haul, being handled but once in transferring from bottom caisson up to the dumping place, generally a truck. This feat was never possible with any other equipment until Mr. Moran took the lead and perfected his devices, shown in Fig. 3.

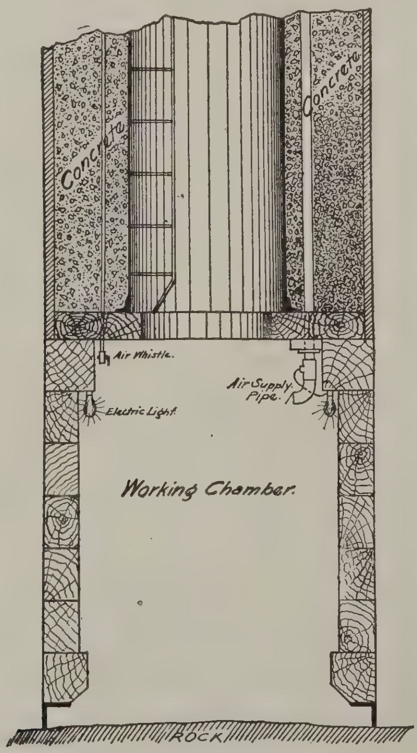


FIG. 2.

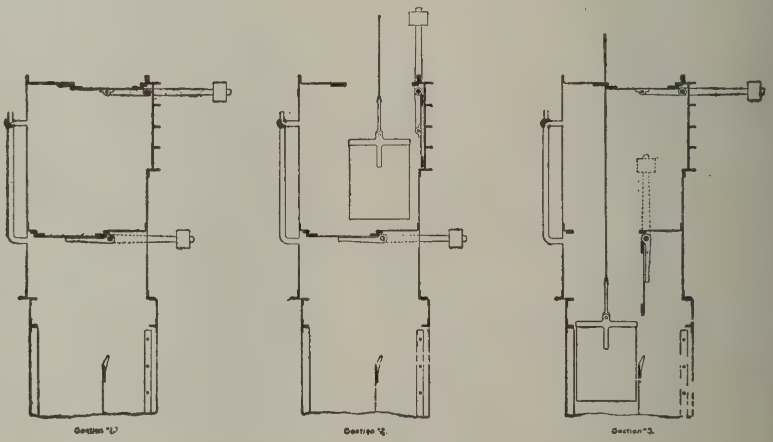


FIG. 3.

The square and rectangular spaces shown in Fig. 1 give the location of the concrete piers on the site of the Trust Company of America Building. In Fig. 5 is shown the four-boom traveler derrick, which is equipped with four double-drum Lidgerwood hoisting engines, and which effectively covered the entire area. It served to place the caissons, one of which weighed 20 tons and was 14x 31x8 feet high, at their proper location. It also hoisted men and material in and out of the twenty-seven working chambers. A typical caisson or working chamber is shown in Fig. 2.

Fig. 5 also shows the Moran air lock in place near the top of the picture. The man stooping down on the ground is the gauge keeper, who keeps the pressure steady for the convenience of the men in the working chamber, and the man at the air lock communicates signals between the excavators and the engineers.

THE METHOD.

Having a general knowledge of the difficulties and the apparatus to be used, and having finished the description of the underpinning, we shall take up the method employed in sinking the twenty-seven great concrete piers through this soft soil to bed rock without weakening the adjoining foundations. See Fig. 5.

After the wooden caisson proper had been located accurately, the workmen with picks and shovels excavated inside the open topped frame, which gradually sank of its own accord. After it had sunk to water level, which was but 4 to 5 feet below the street, preparations were made to apply the compressed air as follows: The open top of the caisson was roofed temporarily over and the first 10-foot section of the steel collapsible working shaft was joined to the upper part of the caisson, as shown in Fig. 2. Section after section of temporary wooden cofferdam was built and fitted to the outside of the caisson so as to extend its sides upward several feet. This was to act as a false work for retaining the successive thin layers of concrete which were dumped into the annular space inside the cofferdam, on the roof of the caisson and surrounding the working shaft, as will be noticed in the right hand side of section in Fig. 5. After the first 10 feet of concrete had been laid and hardened a second cofferdam was fitted in a higher position, and the concreting continued, the first cofferdam being later removed and used as the third. One gang of men and one mixer could move from cofferdam to cofferdam, applying about a 2-foot layer in each, so that by the time they returned to the first one it was hardened enough to receive its next layer without disturbing the sheeting. So nearly the full height and full weight of the finished pier was used to force the caisson down to its final resting place on bed rock as rapidly as the excavating could be done by the men inside. Alpha Portland cement was used on this job in a 1 to 2½ to 5 mixture.

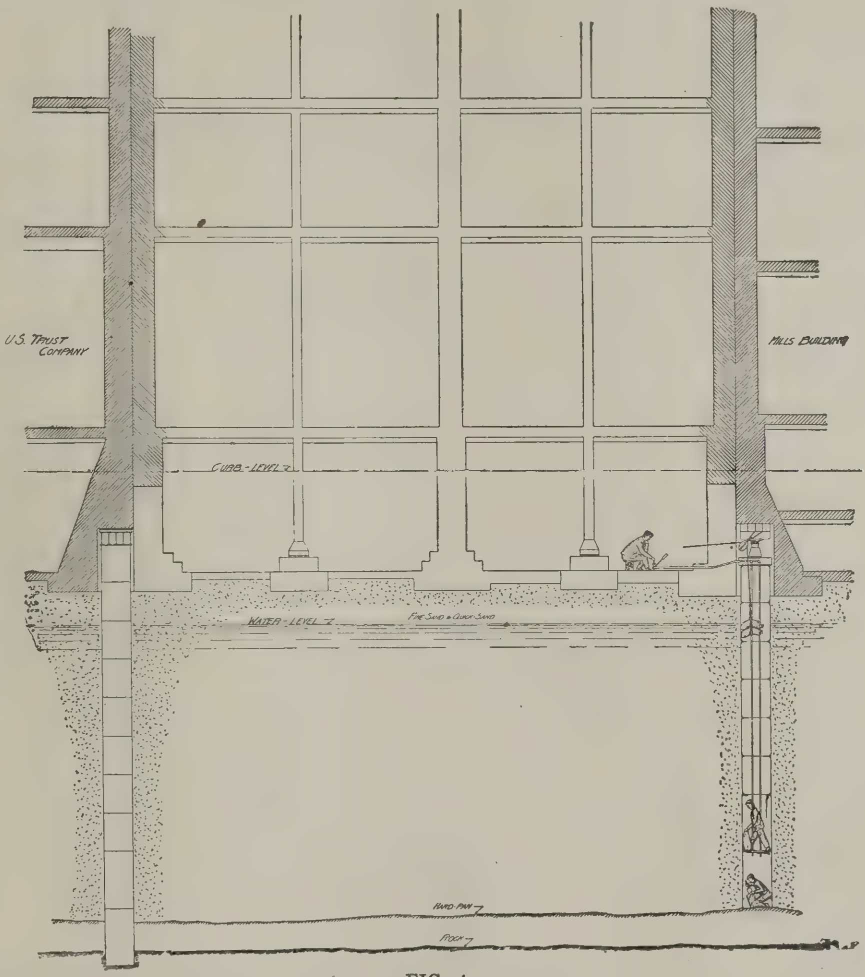


FIG. 4.

Referring again to Fig. 2, it will be noticed that the bottom of the caisson sides is sharpened and is known as the cutting edge, since it follows the level of the excavation, pressed down by the great weight above. The contracting firm have prepared special 2-ton C. I. weights, which can be piled on top of the concrete pier to further sink it in case the "skin friction" on the sides is too great for the pier to sink of its own weight.

During this process three eight-hour shifts of the laborers were digging out material in the caisson under a pressure of from 18 to 24 pounds per square inch. This material was shoveled into buckets and hoisted up through the working shaft and the Moran air lock out to the open air, all in one continuous lift, as previously explained in connection with Fig. 3.

Filling in the Concrete Piers.

Upon reaching the rock it is leveled off and, still under compressed air, the concrete is lowered into the caisson and rammed in place. The entire caisson is filled to the top, the temporary roof removed, and as the men retreat up the tube they unbolt and remove section after section of the collapsible tubing and hoist it up for use in sinking another caisson. Gradually the entire space previously used as a passage for men and material in and out of the working chamber or caisson is filled with concrete, thus making the pier one solid monolith of concrete from bed rock to the column base. This is shown on the left side of Fig. 5.

The Entire Site Enclosed by Bonded Piers.

Referring again to plan view, Fig. 1, it is seen that these piers are sunk end to end, with only 12-inch spaces between, and that the chain of piers around the entire site is made perfect by welding or bonding between the ends of each pier. This keeps the water from the surrounding soil from entering either the basement or sub-basement of the Trust Company of America Building. The method was as follows:

Fig. 6 shows the end faces of the two adjacent piers. The semi-octagonal groove shown in the faces was formed at the time the cofferdam was put around the top of the caisson. The wooden falsework served as a core, displacing the concrete from its top to its bottom from each end face of each pier. As soon as two adjacent caissons were ready to be welded or bonded the space bounded by A *b* A *b* was excavated. At the same time the laborers would tear off the boards A A, saw them into shorter lengths B B, and nail them in the position B B as shown in dotted lines. The space

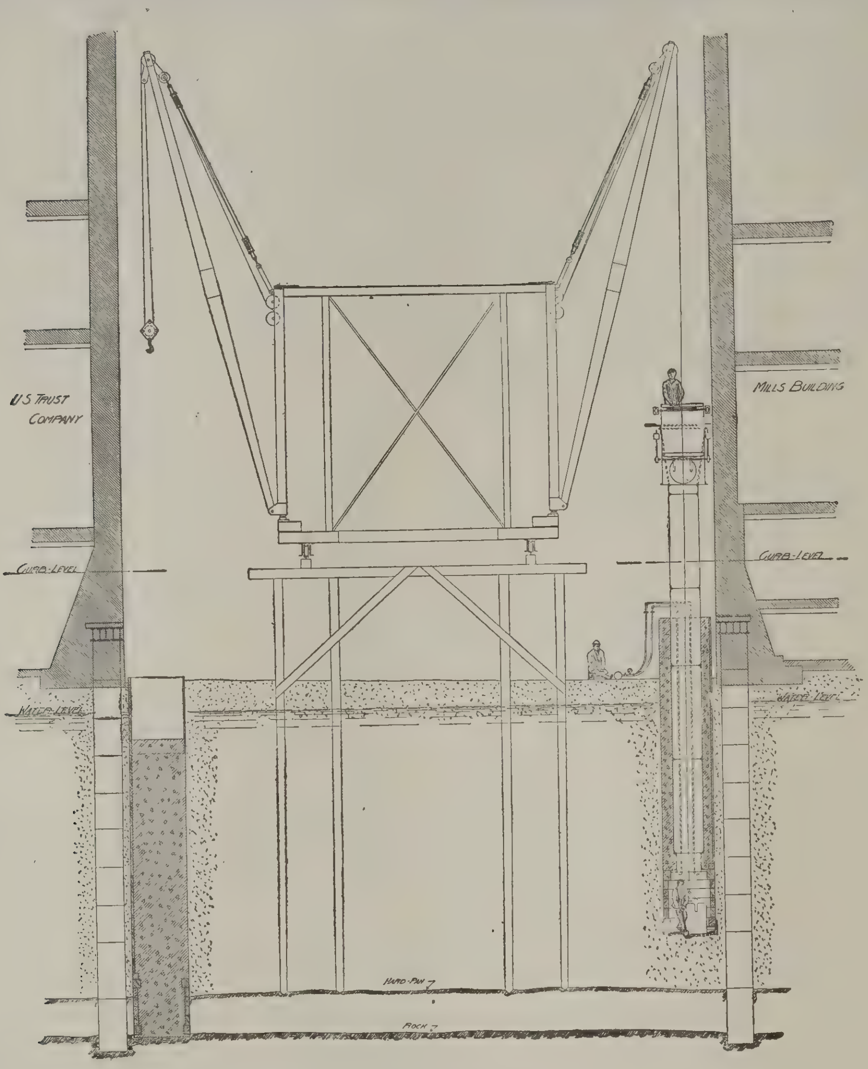


FIG. 5

between the piers thus had become octagonal in shape and was carried down the few feet to water level. The planks *a b c a b c* were removed. A 4-foot length of steel cylinder, 30 inches in diameter, was placed in the opening, and the space between it and the surrounding concrete and boards B B was filled in with concrete and made air-tight. An air lock was bolted to the top of this cylinder and the workmen excavated the material between A and B, tearing out all lumber as they went down, and hoisting all material to the surface except what was needed for completing the boards B B clear down to the top of the caisson. All this octagonal well was then filled to the top with concrete under pressure and the bond was completed. When these connections between piers were completed on the north, east and west borders of the building site, it was only necessary to make the bond with the foundation piers of the Wall Street Exchange Building on the south (put in by the same contractor to bed rock) in order to fully enclose the lot and prevent future flooding of the cellars, which reach to a depth of nearly 40 feet below the water level. It will be seen from Fig. 1 that this was done without expense of sinking a separate line of caissons on that side.

Another advantage in this solid wall type of bonded foundation construction is that those piers in the center of the lot can generally be sunk without the expense of the compressed air method, for there is little danger of any water sweeping in from the outside and therefore of weakening the other buildings.

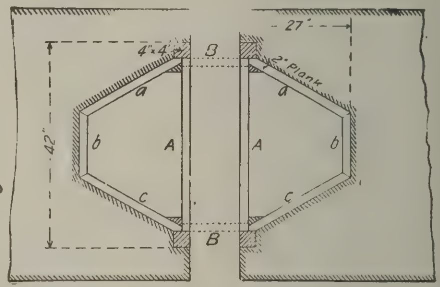


FIG. 6.

At this stage of the job the cellars can be safely dug, during which work the shoring of the neighboring

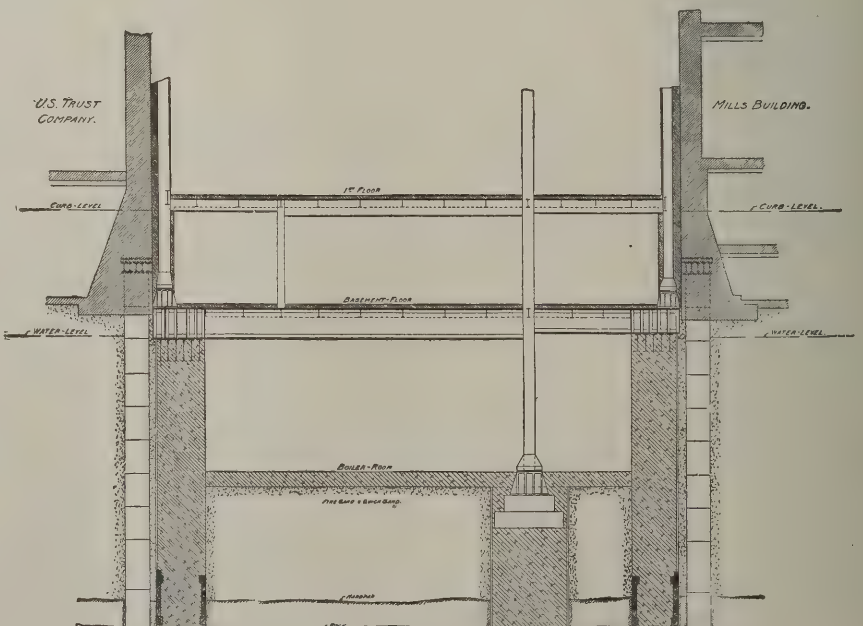


FIG. 7.

building walls is shown in Fig. 7. Fig. 8 illustrates the appearance when all the substructure is completed and the cellar made ready for installing engines and boilers.

The general class of work of which this job is merely one branch is civil engineering in water or water-bearing strata, including mine shafts in wet or marshy lands, bridge piers, sea walls and tunnels. The Foundation Company, New York, are the contractors carrying on the work described.

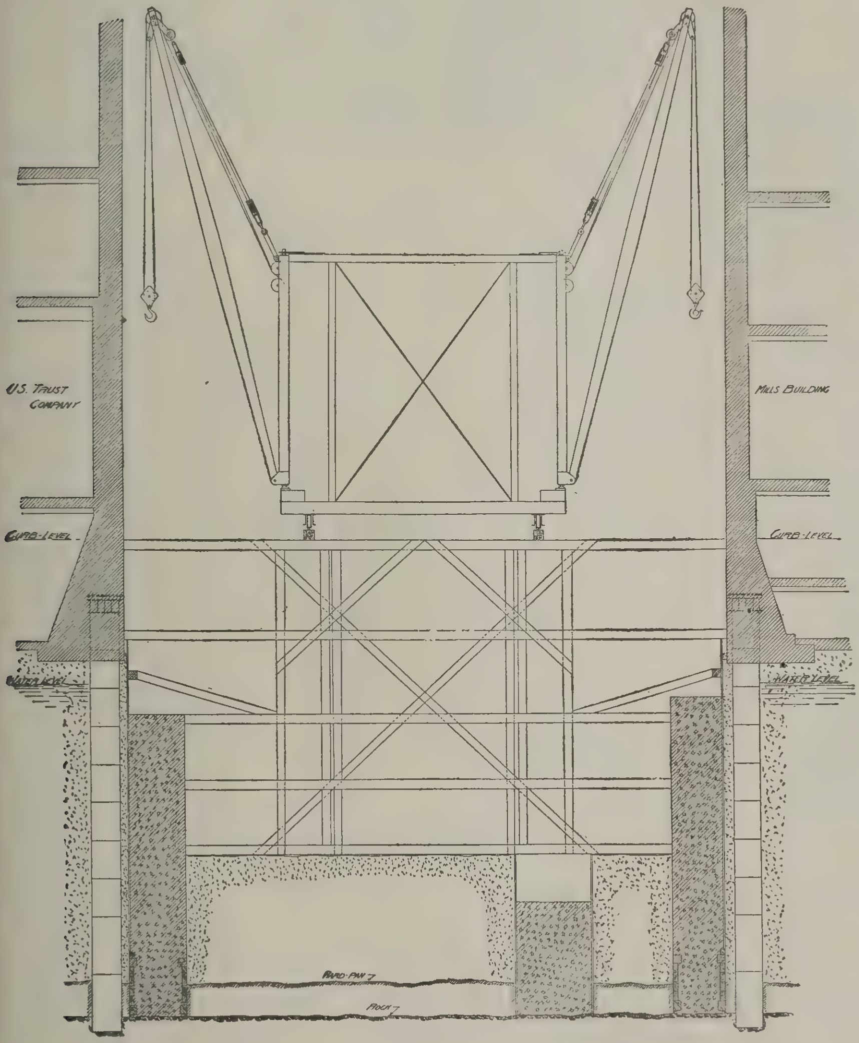


FIG. 8.

An interesting feature to contractors is the yard of the company. After every big contract has been finished the apparatus, such as derricks, hoisting engines, air compressors, collapsible steel shafting, etc., is trucked to the yards, thoroughly cleaned, dismantled, and all worn parts, such as brass bushings, pinions and cables, replaced with new, the whole repainted, date of overhauling noted, and then it is stored under cover awaiting the next contract.

This is an admirable feature and allows the company to begin work on contracts frequently within twenty-four hours after the papers are signed.

ALLOY STEELS.

Iron has been successfully alloyed with most of the known metals; only a few alloys, however, possess much commercial importance, and it is only with these that we have to deal in considering their adaptability for forgings, etc. Alloy steels possess many advantages over carbon steel for certain uses, and notwithstanding their increased cost are finding a wider field of application every year.

Tungsten steel was the first alloy steel to be exploited to any extent. It proved useful in metal cutting tools, and is more or less restricted to that use. Chromium steel was next exploited, and found a wider field of usefulness, being largely used in metal cutting tools as well as for other purposes, the most notable of which is armor piercing projectiles. Manganese steel was next introduced to the market. This steel is remarkable for its toughness, combined with hardness when quenched in water, but, owing to the fact that no means have ever been found of softening it, it cannot be machined. Nickel steel was next brought out, and found a much wider field of usefulness than the preceding, and is today the most largely used of any of the alloy steels.

Vanadium steel is the last applicant for favor, and while it holds out more promise than any, it has probably not fully passed the experimental stage that leads to wide application. It is being manufactured in increasing quantities every year.

Much has been done in combining two or more of the alloys in steel, with such beneficial result that it is hoped to reach almost any desired quality through the proper combination of the metals now at our disposal.

Chrome and nickel produce an alloy steel combining the good properties of each in a large measure, i. e., strength, elasticity and toughness. One desirable feature in this alloy steel is that, with proper heat treatment, it can be made fibrous like wrought iron, which gives it great resistance to shock, with less liability to crack at corners. It is highly susceptible to heat treatment, and requires exact temperatures in order to obtain the best results.

Nickel and manganese produce an alloy steel of high elastic limit proportion, and give great endurance qualities. The combination increases the susceptibility to heat treatment. Silicon and manganese produce an alloy steel of high elastic limit proportion, and also give great endurance qualities.

WITH THE MANUFACTURERS.

Industrial Notes of Interest—Descriptions of Products Which Find a Ready Market Abroad.

ONEIDA TRAPS AND CHAINS.

Away back about the middle of the last century there happened to be a rude blacksmith's forge situated on the land of the Oneida Community. When Sewall Newhouse, a born trapper and hunter, laboriously hammered out his steel traps at this forge it is doubtful if he ever dreamed of the important manufactures that were destined to spring from these humble beginnings.

The Newhouse traps are now known the world over, but at that time they had no reputation back of them. They had only their merit to commend them. It was noticed that they had a relentless grip. The first demand naturally came from the immediate neighborhood. The Indians and the farmers' boys used to come and beg or barter for these traps when they could not afford to buy them. Abundance of wild and dangerous game rendered the traps a protective necessity, aside from considerations of sport or trade. They soon found their way into the stores, and additional forges had to be made to keep up with the demand. Mr. Newhouse taught the young men of the Community how to make traps, so that he soon had a corps of efficient assistants. Large orders from important customers began to come in. The famous Hudson Bay Company used quantities of the traps in connection with its great fur trade. It was necessary to adopt machinery; the business had outgrown the limitations of manual labor. With the addition of machinery they were able to make seven sizes by the thousand dozen, and shipped them to all the frontiers of America. The addition of more machinery from time to time, as occasion required, was simply a matter of detail. It is interesting to note that a large part of the machinery used by the Oneida Community, Ltd., has been invented on the spot by their own men. They solved the mechanical difficulties as they arose one by one. They evolved machinery not only for making traps but for turning out other lines of hardware. Still, the trap department remains one of their most important industries, and these traps are now sold by the million and are favorably known to trappers the world over. One of the original hand made traps was recently found in an out of the way spot, where it had lain for many years. It was as good as ever.

The success which attended the making of traps soon led the Community to enter into other avenues of trade. The first of these was the packing of fruits and vegetables which were raised in their own fertile gardens. This also has developed into a great industry, giving employment to large numbers of people. Mention must also be made of the important manufactures of sewing and embroidery silks. One of the original members of the Community was a humble peddler of embroidery silk. From this beginning a wholesale jobbing business in silk was developed, aad finally the manufacture of silk was undertaken. This, too, has become a thoroughly established and substantial industry. To a layman this factory is specially fascinating, so dainty and attractive are its products and processes. But to the readers of this journal the silverware factory and the hardware factory will, doubtless, possess the most practical interest.

It will be seen from the foregoing that the Oneida Community, Ltd., operates four distinct factories, each dealing with a separate branch of manufacture. Of these the silverware factory is the only one not located within the Community's territory at Oneida. This factory occupies an advantageous site at Niagara Falls. When the manufacture of silver-plated ware was begun in 1877, a grant of water-power was obtained at a merely nominal price; and this was a determining factor in selecting the location. The factory has a capacity of about 80,000 pieces a day, and is kept running at about the same pressure all the year round. Among all its varied products there is probably none in which the Community takes greater pride than in its manufacture of "Community Silver," which is so widely and effectively advertised and so well and favorably known alike to the dealer and the consumer.

The manufacture of steel chains by the Community was an outgrowth of the early necessity for providing chains for its animal traps. These chains were made for many years by welding wire links at forges by hand, and these welded links were replaced later by those known as "Safety" links, which are now made in three different styles and are adapted to nearly all the uses to which chains can be applied. The most popular of these is the American flat link chain, which was introduced by the Community twenty years ago. This is a favorite with the hardware trade of the United States and Canada, besides being exported largely to Europe. The two other styles are made of wire, and are known as the "Niagara" and "Eureka." The special attachments to these chains, such as steel snaps, swivels and other devices, are unique in their line and of distinguished efficiency. The steel chains made by the Oneida Community are worn by the cattle on the plains of Texas and in the stalls of Canada, as well as by the dogs and horses throughout the North and West. They form a part of the mechanism of the great labor-saving agricultural implements, and are in use on nearly every one of the leading railroads of America.

The factories are picturesquely situated in the beautiful Oneida Valley, where also is located the historic Community Home. They are all model factories of their kind. The buildings are substantial and attractive, and the grounds about them are brightened by skillful gardening. The Community erects model dwellings for its operatives who have families to maintain; and life in the settlement possesses many attractions for those who live there the year round. Relations between the employers and employees are notably pleasant and harmonious. Readers are probably aware that the sociological phase of Oneida Community life has ceased to exist, as the organization has become a great modern business corporation, and is conducted strictly as such.

With branch offices in various parts of the United States and a large force of salesmen the Oneida Community is one of America's most energetic and successful manufacturing concerns.

WATER FILTERS.

The demand for small water filters is a constantly increasing one. The people of today are realizing far more than in the past the importance of pure water. The "Noxall, Jr.," water filter, made by the American Filter Company, Milwaukee, Wis., is an admirable one for a small flow of water. It is 2x4 inches, weighs 12 ounces complete and filters 5 to 10 gallons of water per hour.

IMPROVED FLOOR HINGE.

ADJUSTING THE SPRING.

A new floor hinge, built on the most popular lines of floor hinge construction, but having several novel features, has recently been placed on the market by the Stover Manufacturing Compan, of Freeport, Ill. This "New Idea" floor hinge can be easily and quickly applied and adjusted without removing either hinge or door, and can be used on any double acting door, whether it be in barn or palace.

The cover can be removed by taking out one screw. The tension of the spring can then be adjusted freely and easily by changing the position of the small pin. This feature is making the hinges especially popular, as the ease of adjustment is a valuable point.

DRILLED VS. PUNCHED PLIERS.

In asserting that punched pliers are much inferior to drilled pliers, manufacturers and advocates of the latter assert that punching the holes is cheaper, but only at the expense of the quality. The punch does not cut but tears the material, leaving round corners, reducing the surface of bearing for the bolt, which in a short time will stick in the slot and eventually enlarge the slot to the same size as the round portion of the hole.

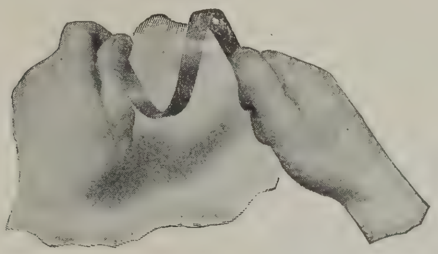
On the other hand, drilling leaves sharp corners where the bolt enters the slot between the round portions of the hole. This gives the bolt all the bearing possible. The bearing can only be secured by drilling the holes and broaching between them.

J. P. Danielson & Co., Jamestown, N. Y., manufacturers of combination pliers, have long been noted for their high quality product and make no punched goods. Their combination tool is gas plier, wire cutter and screwdriver in one. It is drop forged from a special grade of tool steel, oil tempered and finished in a first class manner. It is a very convenient and useful tool for plumbers, steam and gas fitters, machinists, tool makers and electricians.

COMBINATION PLIERS.

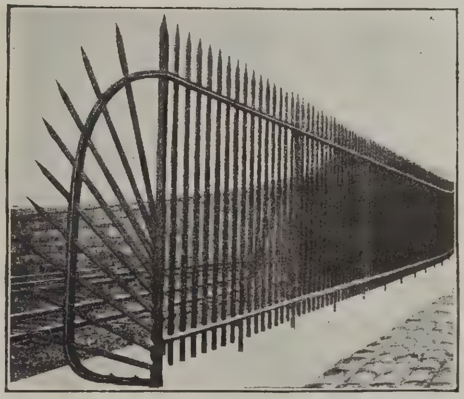
NEW FLEXIBLE HACK SAW BLADE.

The "Culley Flexible" Hack Saw Blade, manufactured and sold by the Simonds Manufacturing Company, Fitchburg, Mass., and 40 Murray street, New York City, is a remarkable blade for the purposes of cutting brass, tubing, stringy metals, etc. It is not merely soft back but is flexible all the way through and possesses just the proper temper for a particular kind of work. It is not intended for use in cast steel or such hard metals. It is used principally by plumbers and electricians, and will also be found very useful for bicycle repairers, automobile manufacturers and all others who work tubing. It is asserted that shelling and breaking teeth, the fault of the ordinary hack saw blade, has been reduced to a minimum in the "Culley Flexible."



SHOWING
THE GREAT
FLEXIBILITY
OF THE BLADE.

IRON FENCES AND FURNITURE.



The Stewart Iron Works Company, of Cincinnati, Ohio, makers of iron fence, lawn furniture, wire and iron specialties, is exporting large quantities of railroad work, such as retaining wall fence, inter-track fence, depot railings, wickets, grilles and similar uses. The export business of the Stewart Iron Works Company has grown rapidly in the last two years.

The lower priced lines of iron fence, entrance gates, lawn furniture, reservoir vases, etc., are not popular in foreign countries—buyers there demand the best goods and are willing to pay well for them.

Among recent export shipments have been wrought iron plantation gates, ornamental wrought iron residence fence and gateways, park fence, cemetery lot enclosures, balcony railings, grilles and window guards, all of wrought iron.

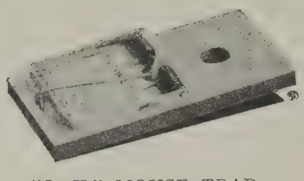
It should be understood, however, that the high priced goods mentioned herein are not the only grades manufactured by this company. On the contrary, the goods are priced exceedingly low considering the quality.

The photograph reproduced herewith shows some work erected for the export trade.

Foreign hardware dealers are acting as agents for the company, and find the line a very attractive and profitable one.

Catalogues in English and Spanish, covering thoroughly the various lines, are published by the company.

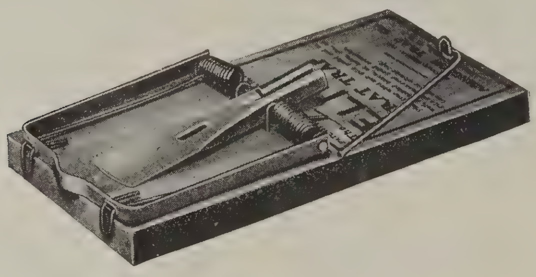
INGENIOUS TRAPS.



"O. K." MOUSE TRAP.

The Abingdon Trap Company, manufacturers of rat, mouse and other traps, Abingdon, Ill., have lately reorganized and enlarged their business, taking on several new traps of the mouse, rat, gopher and game varieties. The line includes the "Eli," "O. K." and "It" traps."

In the "O. K." the pedal is underneath the block, and when the trap is set the front end of the block is slightly elevated, providing a temporary platform and a perfectly smooth surface on which the animal treads in passing, or when attempting to get the bait, at which time the trap is sprung and a capture effected. It is easily operated and without danger to the fingers. You pull back the jaw and the trap is set. It catches them going and coming, and with or without bait. In originality of design, and in ease and simplicity of operation, it is the acme of success.



"ELI" RAT TRAP.

The "It" is said to be the smallest and most successful choker trap known to the trade. It catches and kills instantly mice of any size. It is open in front and has no bottom—nothing to alarm the intruder. Being all metal, it does not become foul from use. The "Eli" is an excellent spring trap.

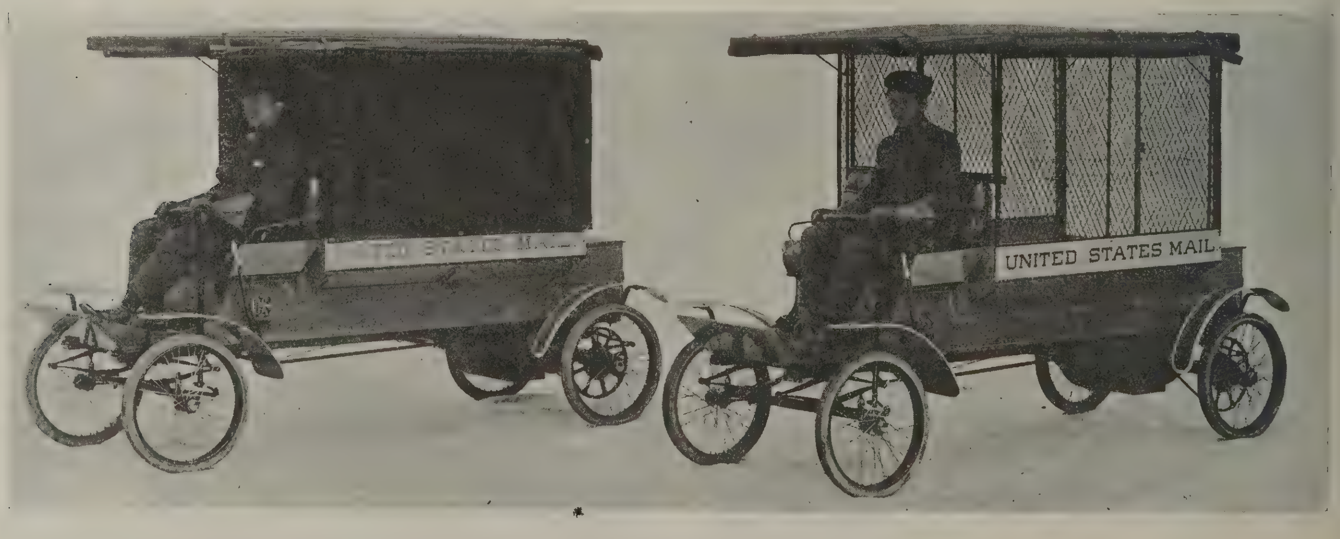
The officers of the reorganized company are as follows: W. C. Hooker, president; F. H. Hooker, vice-president; O. Latimer, secretary; G. A. Shipplett, treasurer, and W. D. Armstrong, manager.

Illustrated herewith are two of the popular lines of traps made by this concern. It is to be noted that these manufacturers are making special inducements to the foreign trade at the present time.

MOTOR CAR DELIVERY OF MAILS.

During June and July of 1906 the United States Post Office Department conducted some very comprehensive tests of the Orient friction-drive buckboard as adapted to the rural free delivery service, two cars being employed in the tests, which were conducted over some of the worst routes that could be found in Maryland, Virginia and the District of Columbia. The cars came through with a perfect record, not a single stop being made for repairs or adjustments, nor were any adjustments made at the garages between the tests. The Government had a very competent official in charge of the tests as an observer, and his report was of such a satisfactory nature that the prohibition was removed against rural mail carriers using motor vehicles on their routes, it having been previously considered that they were unreliable and could not serve a route with regularity. While the use of any type of motor cycle or motor car was permitted thereafter, the buckboard was recommended on account of its light weight, small cost and flexibility of control by means of the friction transmission as probably the most desirable for use by the mail carriers, who work on very small salaries. As a result of these successful tests the Post Office Department has since then taken a great deal of interest in motor vehicles and their adaptability in service of the various departments of the postal service. Of their own initiative they requested from the Waltham Manufacturing Company the loan of a single-cylinder buckboard runabout, complete with top and lamps, such as was used in the Government tests, and this car they are to-day showing in their own exhibit at the Jamestown Ter-Centennial Exposition at Norfolk, Va. In their exhibit they show the various types of vehicles and modes of conveyances which have been used in the Rural Free Delivery service since its inauguration, and the buckboard takes a prominent position as the very latest and ideal method of delivering mail on country routes. The Department went even further and ordered two 8 horse-power service cars built up into the regulation screened wagons used in the cities for the conveyance of mail pouches. These two cars are for the use of the Exposition Post Office, located in the Government Building at the Jamestown Exposition. One car is required to make nine round trips per day between the Exposition Post Office and the Norfolk Post Office, representing a total distance of about 90 miles per day. The second car operates between the Exposition Post Office and the steamship docks at Pine Beach, in addition to which it distributes the special pouches among the different buildings on the grounds. This second car will negotiate about 50 miles per day.

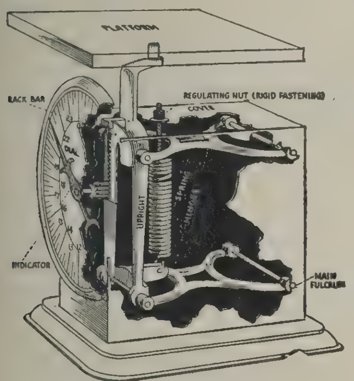
A permanent garage has been erected on the grounds.



RAPID SYSTEM OF DELIVERING MAILS.

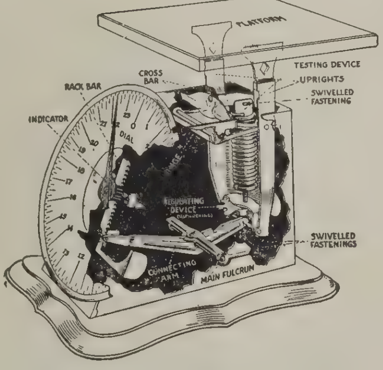
NEW SLANTING DIAL SCALE.

In the new slanting dial family, counter and office scales which the Triner Scale Manufacturing Company, of Chicago, have recently protected by patents in the United States and foreign countries, the manufacturers claim that the new invention enables them to produce an absolutely accurate scale at a low price. The general features of the new scales are the dial, set at a convenient angle so as to be reached without stooping, and the double steel upright which supports the platform. Between these two uprights which support the platform and the dial is the main fulcrum, so that even if the article is placed off the center of the platform the tilt of the uprights will cause no false effect upon the indicator, and thus is overcome the objectionable deficiency in the mechanism of the old method of construction, which, by tilting the upright, registers either too light or too heavy when an article is placed slightly off the center of the platform, which is caused by having the main fulcrum at the lower end of the scale.



OLD STYLE OF COUNTER SCALE.

The spring in this scale is swiveled at both ends and is fastened in the center both ways of the uprights, and cannot cause friction on the bearings; while in the old method of construction the spring, being back of the upright, has no swivel at its upper end, and thus when an article of half the capacity of the scale is placed slightly forward from the center of the platform it forces the mechanism half way down and brings the uprights considerably to the front, so the spring, being fastened to the lower end of the upright, is obliged to bend, causing friction on the bearing and false indications.



NEW SLANTING DIAL SCALE SHOWING IMPROVEMENTS.

An entirely new feature is the crossbar at the top, scientifically constructed to resist the tension of the spring to which the latter is attached. This enables the scale to register accurately at all points of the dial before applying the cover. This is proof that the scales can be made more accurate than those requiring the cover before they can be tested.

The manufacturers have also provided a self-locking device on their regulating screw which prevents it from being shaken or jarred out of position set, and, being inside of the frame, cannot be tempered with.

Another point of merit is that the interior parts, as well as the frame, are constructed of cold rolled steel, making them light, strong, uniform, interchangeable and preventing breakages in transportation, which is a common occurrence with those where the parts are made of cast iron.

This suitability for transportation is an important feature when goods are to be shipped abroad. This company is a great believer in taking extra precautions in packing goods, especially for the foreign market.

VENTILATED METAL LOCKERS.

In the United States the ventilated metal locker has come to be regarded as a necessity. It is used by college students, by ball players, by office and factory and railway employees, and by many others for temporary storage of apparel and personal effects.

Lockers have indeed grown in America to be an important line of manufacture. Their ventilation is effected by the use of perforated sheet steel or of wire netting, or of "expanded metal." Too much perforation lets in the dust and is objectionable.

It is interesting to note the ingenuity of the manufacturers in matters so simple as the fastenings of a locker.

At first an ordinary padlock was used. This was voted too clumsy. Next came a cabinet lock, master keyed, the master key being held by the custodian. This, too, proved too clumsy in the estimation of those who sometimes forgot their keys. Then came keyless combination locks of various degrees of merit. These are rapidly displacing the keyed locks. Especially popular are such as are extremely simple in action, with "click" and stop that render their operation as simple as reading the time of day by a clock. In fact the leading locks have clock dials, and are called "time locks.

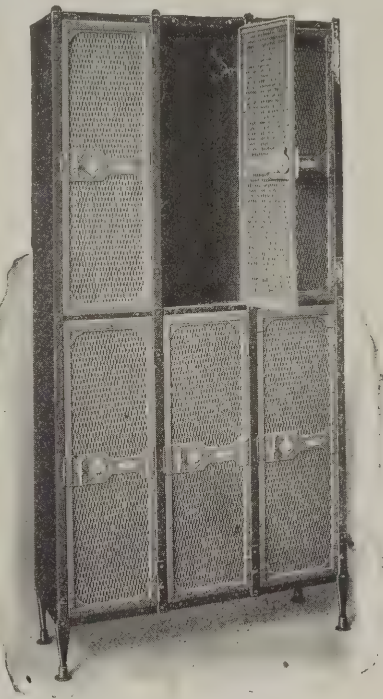


FIG. A.

Many of these features will be understood by reference to the illustrations.

"A" shows a popular arrangement of lockers of small size. "B" illustrates the keyless "time" lock as it appears in service. "C" shows the lock upon the inside of the door, with a sort of bolt that prevents wedging the door open. This is a most satisfactory, effective and durable arrangement.

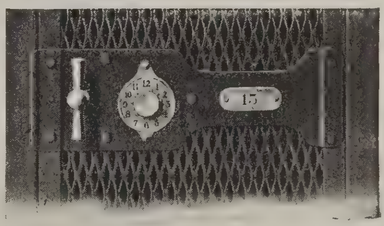


FIG. B.—KEYLESS TIME LOCK IN SERVICE.

The Miller Lock Company, Philadelphia, Pa., U. S. A., patentees and sole manufacturers of this class of 'time" locks, are selling a very large number of them.

The same concern manufactures a wide range of locks, treasure boxes and similar goods. The factory has a daily output exceeding 10,000, and their product is known to hardware dealers and importers in all corners of the earth.

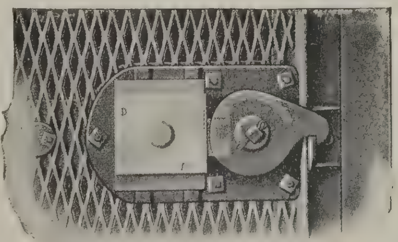
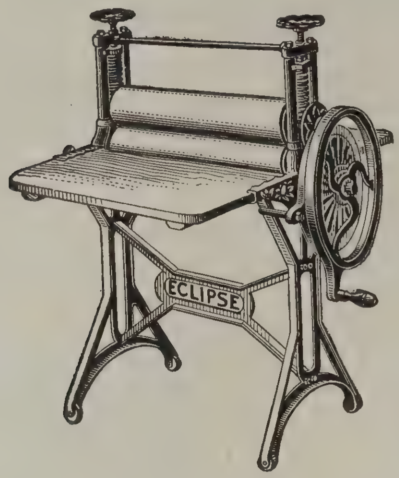


FIG. C.—LOCK ON INSIDE OF DOOR.



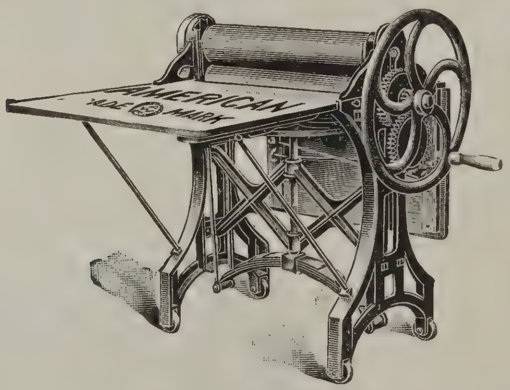
ECLIPSE MANGLE.

POPULAR MANGLES.

Importers are placing large orders for the well known Eclipse and American mangles. This line is manufactured by the American Wringer Company, New York, and is especially adapted for use in large families, laundries and hotels. The criticism of some mangles, due to their lightness and unsubstantial make, is avoided by these mangles, which are unusually heavy and solid.

The Eclipse gearing is covered by a shield to avoid accident to the user. The rolls are of selected hardwood. The mangle is mounted on casters and is very easily moved. The double gearing makes easy turning, and the pressure is obtained by the use of the pressure screws and coil springs at the end of the rolls.

The American Mangle is an ideal machine for use in hotels and large institutions. The pressure is obtained by the use of a wheel screw under the rolls, operating on a five-leaf steel spring.



AMERICAN MANGLE.

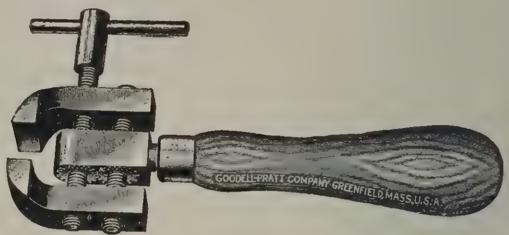
The American Wringer Company's extensive line of clothes wringers, ironing machines and mangles are being exported in large quantities.

AMERICAN CEMENT BLOCK MACHINES IN EGYPT.

Concrete is said to be the favorite building material in Cairo, Egypt. One large American concern, the Century Cement Machine Company, of Rochester, N. Y., recently shipped six Hercules cement block machines to one contractor in that city, this being the second order from this contractor, who has been operating four of these machines for two years. It is understood that the last shipment is to be used in making concrete blocks for an elaborate public building of great architectural beauty.

NEW HAND VISE.

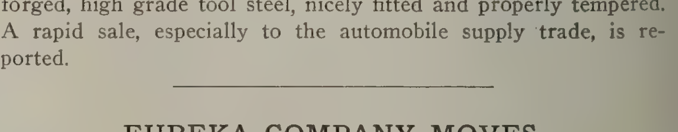
The Goodell-Pratt Company, of Greenfield, Mass., are putting on the market a new hand vise of unique construction, provided with a double screw geared together, insuring parallel jaw faces up to their extreme capacity, and making it possible to secure a firmer hold than could be accomplished by the use of a single screw. The jaws are made of drop forgings with faces scored; the socket, screws and equalizing gears are all of steel; the handle is hardwood and the finish of the metal parts varies in the two different styles they are offering. The jaws open 1½ inches, and their faces are 1⅜x⅜ inches. They are furnishing these in the black finish, and also full polished and nickel plated. This well known manufacturing company reports a greatly increased volume of export trade, and are shipping large orders for the foreign market.



BENT-NOSE PLIERS.

Mr. Louis F. Taussig, of the well known hardware and cutlery firm of Wiebusch & Hilger, New York City, will sail for South America on August 11 for a six months' trip in the interests of the company. He will visit the hardware importers of all the principal South American cities.

Wiebusch & Hilger have just put on the market Hjorth's Bent-Nose Pliers, especially adapted for electricians, plumbers and automobilists. The pliers have an angle of 45 degrees at the nose, enabling the operator to use them where it is impossible to use a straight-nose plier. The pliers are made from drop-forged, high grade tool steel, nicely fitted and properly tempered. A rapid sale, especially to the automobile supply trade, is reported.



EUREKA COMPANY MOVES.

Foreign customers of the Eureka Machine Company, manufacturers of concrete mixers, should note that the company has just moved from Jackson, Mich., to Lansing, Mich. The change gives the company more room and better facilities for their rapidly growing business. The factory is built entirely of concrete, pilaster and panel construction.

The Sturtevant Engineering Company, of 147 Queen Victoria street, London, England, the European representative of the B. F. Sturtevant Company, of Boston, Mass., has just opened a new office at 2 Rue Lebeau, Brussels.

KEROSENE OIL ENGINES.

There are many cases where a small engine using ordinary kerosene oil as fuel is preferred to a gasoline engine where the latter fuel is difficult to obtain, or, if obtained, only at a prohibitive price. In these cases the kerosene engine, marine or stationary, is more practicable, and it is noticeable that there is a growing demand abroad for this class of engine.

To meet the rapidly growing export demand for this type of engine the Remington Oil Engine Company, of Stamford, Conn., has placed on the market both marine and stationary engines of single and multiple cylinder. They are vertical internal combustion oil engines without valves, receiving an impulse for every revolution of the flywheel.

This impulse is a shove, caused by a slow combustion of the fuel, and not a blow, as is caused by the explosion in the ordinary internal combustion engine. This long continued, slow pressure on the piston, instead of a sharp blow, relieves the engine of the severe stresses to which violent explosions would subject it, and its action is much like that of the steam engine.

An important feature of the engine is that all parts are so designed and placed that they may be easily and quickly taken out and examined or repaired. This feature will appeal to those where delays cost money.

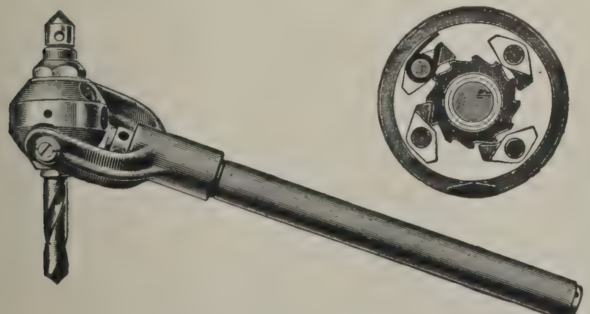
A governor acts directly on the fuel supply, regulating the amount delivered at each charge, and the speed regulation is close enough for the electric light current generation.

The principle on which the Remington oil engine operates is original with this engine, and is such that all cracking of the oil and consequent deposit of carbon is eliminated. The ignition is by a hot surface, but is so arranged that premature firing, with its consequent loss of power and excessive wear on the bearings, is also eliminated.

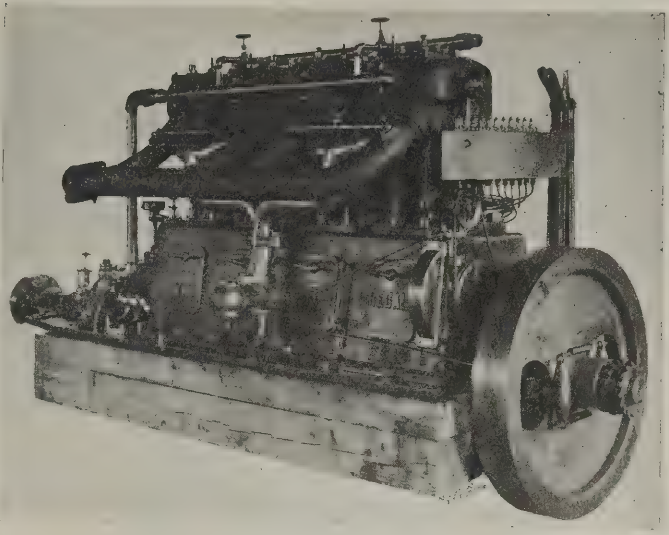
The marine engine is especially adapted to cruising launches and to business boats, where reliability and economy of operation are of more importance than high horse power with little weight.

HANDY RATCHET.

All dealers in and users of tools are interested in a novel ratchet which the manufacturers claim will drive a drill in any position where it is possible to move the handle either in a vertical or horizontal direction or at any intermediate angle. The movement is a new one. Aptly named the "Universal" ratchet by the makers, the Armstrong Brothers Tool Company, of Chicago, Ill., this universal quality of the tool is due to the fact that the axis of the two trunnions on which the handle turns is at an acute angle with the axis of the drill. About 2 inches of the motion of the end of the handle in any direction will direct the drill. There are twelve large teeth and five pawls in the No. 6 ratchet, hence the pawls catch sixty times in a revolution. This results in fast cutting.



"UNIVERSAL" RATCHET WITH CROSS SECTION.



45 H. P. SLOW SPEED ENGINE.

NEW TYPE OF SLOW SPEED ENGINE.

There is a growing demand for heavy duty slow speed gasoline engines for commercial use, and there is an especially strong foreign demand for engines of this kind. Yet only a few manufacturers have as yet devoted their attention to the production of engines of this class. The Regal Gasoline Engine Company, of Coldwater, Mich., have recently brought out a line of heavy slow speed marine engines ranging in capacity from 6 to 45 horse power.

The one illustrated is a 45 horse power, four cylinder engine, of 7½ inches bore by 9 inches stroke. Its dimensions are as follows: Length of base, 86 inches; width of base, 28 inches; diameter of crank shaft, 2¾ inches; center of shaft to top of cylinder, 35 inches; length of crank case, 54 inches; diameter of balance wheel, 28 inches; face of balance wheel, 4 inches.

The crank shaft and connecting rod are forged from open hearth steel and are full machine turned. The connecting rods at the piston and crank shaft are in bronze boxes, babbitt lined, with take-up, and the gears and crank shaft boxes are phosphor bronze. The levers for working the reverse gear are at the front of the engine and conveniently located. Lubrication is by force feed and is driven by the belt and wheels shown on the front of the crank case. One of the levers immediately over the lubricator regulates the timing spark, the timer box being located at the top of the crank case. The second lever works the throttle in the carburetor. The governor also works on the throttle in the carburetor, perfectly controlling the speed of the engine and preventing racing. The jump spark style of ignition is used, the equipment being dynamo and storage battery.

The engines are heavily constructed throughout, built for heavy service and are designed to be specially adapted for cabin launches, commercial boats or fishing boats.

The manufacturers make four sizes of these engines, namely, 6, 12, 24 and 45 horse power, weighing respectively 750, 1,400, 2,000 and 4,300 pounds. This line of slow speed engines is in addition to the line of motor boat engines this company has been building for several years.

Owing to the continued heavy foreign and domestic demand for its traction engines the Avery Manufacturing Company, of Peoria, Ill., has found it necessary to greatly increase facilities for handling its output. One important improvement is the erection of a number of large sheds capable of accommodating in all about eighty engines. This will enable the company constantly to keep on hand a larger stock of engines of all sizes and to fill orders with dispatch.

ASBESTOS SAD IRONS.

The Dover Manufacturing Company, of Canal Dover, Ohio, are devoting increased attention to exporting their Asbestos Sad Irons. These unique and serviceable articles are made in various shapes and weights for all kinds of ironing, from pressing the heaviest cloths to smoothing the daintiest fabrics. The principal parts of the sad iron are the hood or cover and the core or iron proper. This hood is lined with asbestos, the most satisfactory non-conductor of heat available. The hood is longer than the core, and an air space is therefore left between the hood and the core. This air space in the asbestos-lined hood prevents the radiation of heat from the core. Hence the handle cannot get hot. Moreover, the conduction of heat to the handle is prevented by a shield.

The hood covers up any sooty deposit that might accumulate on the iron. All metal parts are handsomely nickel plated. The edges are rounded so as not to cut the goods being ironed.

The line includes laundry sets, French set, flounce set, sleeve irons, shirt waist set, tourist set and cabinets. The manufacturers publish an interesting booklet, "Asbestos Sad Irons: Their Story," which makes instructive reading.

The Dover Manufacturing Company have never given personal attention to any foreign market except Canada and England. In Canada their goods are just as well established as they are in the United States.

This year they conducted a personal campaign in England and met with flattering success. All other foreign markets are, therefore, virgin territory and the importer who is first to appreciate the possibilities of Asbestos Sad Irons will be able to command a highly remunerative business.

They may decide to develop other foreign markets personally, but this work will be confined at first to the countries in which their goods have been partly introduced by importers. It is their present intention to make connections for exclusive representation with desirable importers in each market whenever they begin personal campaigns.

LARGE FIRE HOSE MANUFACTURERS.

Mr. Isaac B. Markey has recently been elected a vice-president of the Eureka Fire Hose Company, 13 Barclay street, New York City, one of the largest manufacturers of fire hose in the United States. Mr. Markey has been prominently identified with the Eureka Fire Hose Company for many years, and is well equipped in every way to assume the increased responsibilities which will come to him in his new work.

NEW CONTRACTORS' PUMP.

The liability of contractors to order excess pumping capacity through conservatism has been overcome, it is claimed, by the introduction of the "Emerson Junior" pump, which has just been put on the market. This light pump meets the average contractor's requirements where only a small amount of water is to be lifted. In operation it is similar to the regular Emerson contractors' pump.

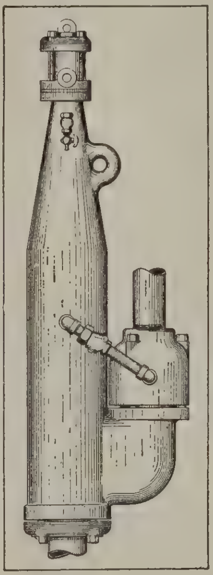
The "Emerson Junior" is made up in three sizes, one weighing 219 pounds, one 290 pounds and the other 410 pounds.

The lighter one is known as type "A," and has a 3 inch suction, a 2½ inch discharge and a half inch steam pipe. The capacity is guaranteed for 100 gallons a minute against a 25 foot head, and about half this amount against a 100 foot head. This, it can be seen, is a notable capacity for a 219 pound pumping outfit.

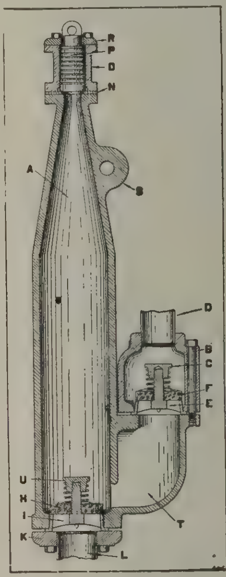
The second, known as type "B," has a 4 inch suction, a 3 inch discharge and a three-quarter inch steam pump. The guaranteed capacity of this type is 180 gallons per minute against a 25 foot head and 100 gallons per minute against a 100 foot head.

The size "C" has a 5 inch suction, 4 inch discharge, three-quarter inch steam pipe, weighs 410 pounds, and has a capacity of 250 pounds a minute on 25 foot lift and 125 gallons on 100 foot lift.

The Emerson Company claim these pumps to be the lowest priced pumping outfit possible to be purchased with equal capacity, and further claim that owing to the exclusive features of its design this pump is more simple and is lighter in weight than any other pump of equal capacity. The Consolidated Equipment Company, 17 Battery place, New York, are sales agents.



EXTERIOR.



CROSS SECTION.

SOLDERING SALTS.

The manufacturers of "Simplicity Soldering Salts" (Billings-Clapp Company, Boston, Mass.) are directing the attention of the trade to the fact that they guarantee the safe arrival of their goods. It seems that fluxes put up in liquid form are frequently subject to leakage while in transit, and it is said that one Australian importer recently found two barrels entirely empty out of a total shipment of five barrels of liquid soldering flux. "Simplicity Salts" is a dry preparation, not subject to leakage, is put up in attractive packages, is free from acid, and is claimed to be incomparably easy to use.

EIGHTY COIN PICTURE MACHINES IN A PHILADELPHIA ARCADE.

AN AUTOMATIC THEATRE.

Almost innumerable varieties of the "penny in the slot" machines have already been exploited, and are to be found in all parts of the civilized world. The newest invention in this line, however, promises to far eclipse any previous machine as a money maker. Talking machines and picture machines are not novelties. A combination of the two, in which the investor of a penny (or any other coin for which the machines may be adapted) listens to a song or a lecture, while at the same time viewing a series of pictures displayed appropriately to correspond with the words and music of the talking machine, is a fascinating form of amusement that will not soon lose its interest or novelty. The mechanism is operated by a small electric motor set in motion by the drop of a coin, arrested upon the conclusion of a selection, and then automatically resetting itself.

There are no levers or handles to pull or push, and no storage battery is necessary. Connection may be made with any electric lighting circuit, and motors are supplied for either direct or alternating current, and for such local conditions of voltage and alterations as may be indicated. The machine is built for all sorts and sizes of coins, as purchasers may prefer, and it uses any of the standard makes of talking machine cylinders, while the usual stereoscopic pictures (which may be either opaque or transparent) are everywhere obtainable. Its adaptability to all sorts of surroundings is therefore evident. All parts of the machine are readily accessible by opening the front door, and an automatic coin register is provided, together with a heavy cast iron safe, with best Yale lock. Over 10,000 ordinary picture machines have been sold by the manufacturers, Rosenfield Manufacturing Company, New York, who anticipate equally as remarkable a foreign trade for this latest invention as it already enjoys in the United States. One of the most extraordinary developments of recent years in the United States and Canada is the "penny arcades" which have sprung up in every direction in all cities of importance. A view of a Philadelphia establishment of this sort, which is supplied with eighty Rosenfield machines, accompanies this article.

NEW COOKING RANGE.

The Union Stove Works of New York, established in 1834, and among the oldest, if not the oldest, exporters of American stoves, has just brought out a new line of cooking ranges.

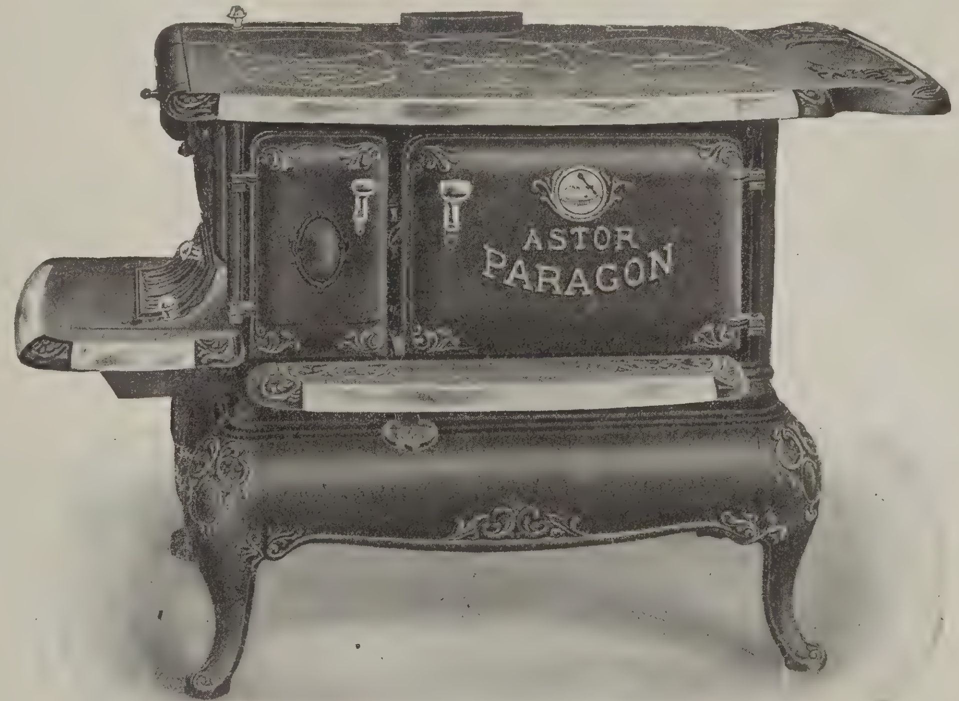
As the cut illustrates, it is manufactured in smooth surfaces, catering to the new idea and popular fancy for plain castings instead of the carved and embossed surfaces that for so many years were the fashion.

The nickel parts are removable for repolishing, and not a bolt is used to hold them to the mouldings of the stoves.

The oven is both artistic in appearance and superior in baking qualiities. With its free draft, large oven capacities, serviceable devices, it leaves little to be desired.

The grate may be withdrawn through the front of the range without disturbing the bricks or any other parts of the fire box. The slide damper in the top is so arranged that the draft may be controlled by any gradation required.

The range is manufactured in two sizes, No. 8-18 and No. 8-20, with ovens 18 inches and 20 inches wide, respectively, and both with and without reservoir attachment, ornamental tea shelf and high shelf, and with or without water back in the fire box for connection to circulating boiler.

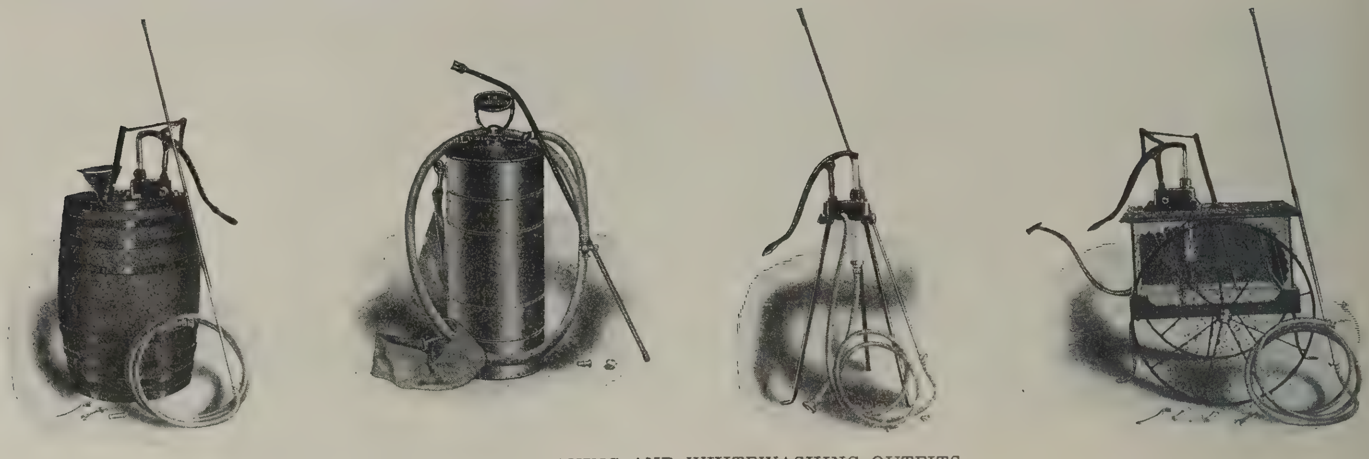


NEW PATTERN OF RANGE.

The manufacturers anticipate large demands, foreign as well as domestic.

The Director of Agriculture at Manila, in a recent letter to the United States War Department at Washington, wrote of "the urgent demand for a Maguey cleaning machine, and of the fact that the 'Prieto' machines are among the best known and most satisfactory fibre-cleaning machines manufactured."

This recommendation indicates that the cultivation of the Agave plant is also being exploited in the Philippine Islands.



TYPES OF SPRAYING AND WHITEWASHING OUTFITS.

SPRAYING AND WHITEWASHING MACHINES.

The variety of uses to which the spraying and whitewashing machine shown on this page may be put renders it an invaluable implement to factories, mills, public institutions, parks, and in general to all owners of buildings and properties. For the farmer and the horticulturist it is most effective in spreading disinfectants, destroying insect pests and diseases on trees, vines, vegetables and other plants, and is equally well adapted for domestic purposes, such as extinguishing fires, cleaning windows, washing wagons, etc.

For applying whitewash, calcimine or cold water paints the Progress Sprayer and Whitewashing Machine is said to be especially adapted. One man can cover a surface equal to 10,000 square feet in a day, and perform the work better than with a brush, as by the method employed the liquid reaches crevices and depressions which a brush could not easily do. Tobacco manufacturers, leaf tobacco packers and cigar manufacturers have also found this machine peculiarly appropriate for certain work.

The machine includes a 20-gallon galvanized iron tank, mounted on 30-inch iron wheels, having 28-inch width of tread; one pump and one automatic agitator for keeping the liquid stirred; two 12½-foot lengths of ½-inch discharge hose, two 8-foot lengths of spray rod in three pieces, one strainer, one wrench, one spanner, two stop cocks and several varieties of nozzles. Briefly, it is a portable waterworks system, because it develops a pressure of over 80 pounds and lifts the liquid more than 80 feet higher than its own level. This is done by a slow, easy movement of the pump.

The Simplicity Automatic Sprayer is also suitable for disinfecting, spraying flowers and plants, and excellent for spraying and conditioning tobacco. It is operated by air pressure and is made entirely of brass. A few strokes of the pump gives 50 pounds pressure. No labor is necessary to produce the spray. The sprayer is adapted for carrying on the shoulder.

The manufacturers, the Dayton Supply Company, Dayton, Ohio, also manufacture the Climax Spray Pump, especially valuable for spraying cattle and poultry, applying whitewash and cold water paints. This pump has been on the market for twenty years and is very popular.

An excellent outfit for destroying insect pests and diseases on field plants, vines and trees is the Climax Barrel Outfit, so arranged that two discharge hoses can be used.

ACME PAINTS ABROAD.

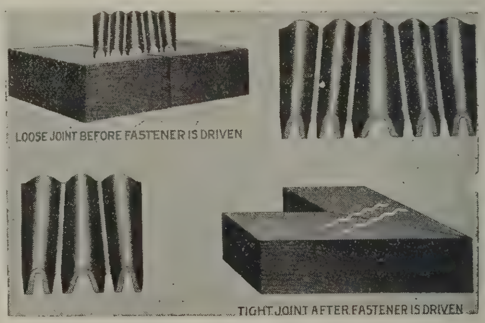
The Acme White Lead & Color Works, of Detroit, Mich., U. S. A., are fast gaining recognition for Acme Quality goods in foreign countries. A bedstead enamel dipping outfit has just been sold to a prominent bedstead manufacturer in Kemper, Rhein, Germany. They have made special arrangements for distributing their paints, enamels, stains and varnishes in Chile. Extensive preparations are also being made to cover the Cuban market thoroughly.

This increasing foreign demand, together with the demand created in the United States by their extensive magazine advertising, has forced the company to enlarge their plant considerably. A complete new white lead works is now being built, and will be finished by the first of the year. This enables them to greatly increase their output.

Their varnish plant, long known as one of the most complete and best equipped in the world, is being doubled. It is said that when finished this will be the most modern plant of the kind in existence.

ACME STEEL GOODS COMPANY.

The Acme Flexible Clasp Company, which started twenty-seven years ago to manufacture its well known flexible clasp, has just changed its name to that of the Acme Steel Goods Company. The change was due to the fact that while the company still manufactures the Acme flexible clasp and similar specialties, these goods are so small a part of their business that the name had become misleading. No other change has been made in the company.


LOOSE JOINT BEFORE FASTENER IS DRIVEN
TIGHT JOINT AFTER FASTENER IS DRIVEN

EDGE CORRUGATED FASTENER.

They are making at present an improved edge corrugated fastener, saw edge, which drives much quicker and easier into all kinds of wood, whether hard or soft, on account of this improved edge. Another feature of this fastener is that it does not tear down the wood when it is driven, as the old style corrugated fastener does. At the present time this fastener is being packed in small packages of 1,000 and 500 in a package, and is sold to the hardware trade, who retail the small packages.

TRADE PUBLICATIONS

Boats.—The Bay City Boat Manufacturing Company, Bay City, Mich., is sending out to its patrons and friends an attractive catalogue, dealing with the various products of its manufacture, which include yachts, launches, rowboats, canoes and engines.

Paving Tools.—A catalogue of 146 pages, neatly gotten up and attractively illustrated, has been issued by John Storitz & Son, Philadelphia, Pa., in which their large line of tools and specialties for pavers and cement stone contractors is fully described.

Shears and Scissors.—The Atlas Shear Company, Bridgeport, Conn., has now ready for distribution Catalogue No. 17, describing its "Atlas Brand" of hardware specialties, including shears and scissors of every description, for domestic and foreign use.

Corn Milling Machines.—Catalogue and Price List No. 6, issued by the Wolf Company, Chambersburg, Pa., is devoted to flour and corn milling machinery, describing important improvements recently made in the construction of the company's mills, crushers, separators, etc.

Embossed and Decorated Metals.—The Alphonso Walrath Company, Fort Plain, N. Y., has issued an attractive booklet, dealing with embossed and decorated metals for trunk coverings, advertising purposes, calendars, toys, etc. The work is illustrated, and many new patterns are shown.

Engine Stops.—The new catalogue of the Locke Regulator Company, Salem, Mass., should interest a very large class of machinery users. It gives full description of the "Locke" safety applances for steam and electric motors, and deals particularly with the "Locke" automatic engine stop and speed limit system.

Hammocks.—The Hohlfeld Manufacturing Company, Philadelphia, Pa., is distributing to the trade its 1907 catalogue descriptive of its line of hammocks, which consists of a large assortment of different styles and patterns. The illustrations are produced in colors, clearly bringing out each particular design.

Marine Motors.—The Ferro Machine and Foundry Company, of Cleveland and New York, have recently issued handsome booklets in English, French, Spanish and German illustrating and describing their well known line of marine motors. The company reports heavy foreign sales for their motors during the past few months.

Wood-Working Machinery.—The latest catalogue brought out by the Cordesman-Rechtin Company, of Cincinnati, Ohio, covers the company's newest and most improved designs in saws and all classes of wood-working machinery. The descriptions are given in detail, and the illustrations are clear and comprehensive.

Hardware Specialties.—A well executed and valuable catalogue has just been issued by the Arcade Manufacturing Company, of Freeport, Ill., the well known manufacturers of coffee mills, hardware specialties, cork pullers, toys, molding machines, etc., descriptive of its entire line of products, which embraces in the neighborhood of 400 different articles. The catalogue is handsomely gotten up and contains a detailed description and illustration of every article of the company's manufacture. It is admirably arranged, and is of especial value to foreign buyers, as, in addition to the descriptive matter, export particulars are given bearing upon weights, manner of packing for foreign shipment, etc. Any of our readers who are interested may obtain a copy of this catalogue by making application to the company for same.

Paints.—The Acme White Lead and Color Works are distributing an unusually handsome and well arranged catalogue of their famous line of paints. This is a booklet which will interest all hardware and paint dealers, and is a valuable assistant in buying.

Marine Motors.—Considerable interesting information on the subject of valveless motors is contained in the new catalogue of the Lackawanna Manufacturing Company, of Newburgh, N. Y. While designed primarily to illustrate the merits of Lackawanna valveless motors, its contents should prove of interest and value to all users of marine motors.

"Idealite."—Under the title "Idealite" the Ideal Concrete Machinery Company, of South Bend, Ind., are issuing a handsome periodical in the interests of their Ideal block machines and mixers, and of concrete users in general. Each number contains matter of value and importance to the dealer in or user of concrete machinery and materials.

Steel Game Traps.—A large line of steel game traps, weldless steel chains and other hardware specialties are shown in Catalogue 31-A, now being distributed by the Oneida Community, Ltd., Oneida, N. Y. The book is conveniently arranged for reference, and complete price lists and other information of value.

Iron Cements.—The Smooth-On Manufacturing Company, Jersey City, N. J., has recently issued the second edition of its No. 5 Instruction Book. The book tells a few of the many ways in which the different Smooth-On cement specialties have been used and the results obtained, and its contents will prove interesting and valuable, especially to users of steam.

Hollow Rod and Cable Drills.—The Cyclone Drill Company, Orrville, Ohio, has just brought out its general catalogue for 1907. It illustrates the company's hollow rod and cable drills, together with a few illustrations of core and combination machines. These latter machines embody some new and original ideas likely to interest all drilling machinery users.

Foot and Power Presses.—Temporary Catalogue No. 15, issued by the Ferracute Machine Company, Bridgeton, N. J., refers to nearly 500 kinds and sizes of foot and power presses for working bar and sheet metals, paper, cloth and leather. It gives a brief description of the machines illustrated and also furnishes suggestions helpful to users of such apparatus.

Direct Current Motors.—Under the title of "Information Book of 'Standard' Motors" the Robbins & Myers Company, Springfield, Ohio, has produced an interesting work bearing on direct current circuits. Numerous styles of "Standard" motors for which this company has become so well known are illustrated, with full descriptions of their construction, uses, etc.

Whitewashing Machines and Air Pumps.—Two booklets which should prove of interest to a large number of dealers have been brought out recently by the Goulds Manufacturing Company, of Seneca Falls, N. Y. One deals with whitewashing and painting with spray pumps, and the other treats of hand and power air pumps for automobile tires, sprinkler systems and gas-engine starters.

PUBLISHERS' PAGE

AMERICAN EXPORTER

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Copyright, 1907, by the W. J. Johnston Estate.

The American Exporter, established more than thirty years ago, is the pioneer and the most extensively circulated publication devoted to furthering of relations between importers and merchants the world over and manufacturers of American goods. It is published on the first of each month in English and on the fifteenth in Spanish (Exportador Americano).

The American Exporter is both independent and impartial. Its publishers have no connection with any manufacturing concern, export house or other business except publishing, and hence have no outside interest to serve. The editorial management is separate and distinct from the business department.

Subscription price to any part of the world, including postage, $2 per year, American gold, or its equivalent sum in any other currency. Single copies, 20 cents.

TRANSLATION DEPARTMENT

Of the American Exporter, where more than 1,700 foreign letters a month are translated for American manufacturers, in addition to our own foreign correspondence.

IMPROVEMENTS.

Our readers will notice that with this issue we have inaugurated some changes in the "make-up" of the American Exporter's reading pages.

It is our aim that each issue shall not only contain a collection of valuable and interesting articles of foreign trade bearing, but also be handsomely illustrated and attractively arranged typographically.

We believe that the grouping of those articles which describe specific manufactured goods under the department "With the Manufacturers" places the matter before our readers in more convenient form than heretofore.

These articles are intended to keep importers familiar with the American market, drawing their attention to new machinery, devices, etc., which find a ready market in foreign countries.

This material, by the way, is received from manufacturers entirely through the solicitation of our editors. It has no connection whatever with our advertising pages, and not an inch of space in this or any other part of our reading pages can be purchased.

This, the "Publisher's Page," will be a regular feature intended to promote a more intimate relationship between our readers and ourselves, so that we may be able to place them in closer touch with the market in this country.

OUR EDITOR'S EUROPEAN TOUR.

Our editor, Mr. B. Olney Hough, who sailed from New York on July 3, on the American Exporter's fifth foreign trade tour, is at present in England, from whence he will shortly leave for the Continent.

His work will be along the line of our policy of bringing together merchants in foreign countries and manufacturers in this. His personal investigations and observations should tend to facilitate dealings with American manufacturers in the future.

His tour includes the following countries: Austria, Belgium, Denmark, England, Finland, France, Germany, Holland, Hungary, Italy, Norway, Poland, Russia, Scotland, Sweden and Switzerland.

Notwithstanding the expense of the trip, its entire cost is borne solely by the American Exporter; no commission of any kind is charged either the foreign importer or the American manufacturer.

Foreign buyers are invited to co-operate with us in making this trip of the greatest posible success. Mr. Hough can be addressed care Hamburger Hof, Hamburg, up to September 1. From Hamburg he goes to Denmark and Sweden.

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1907

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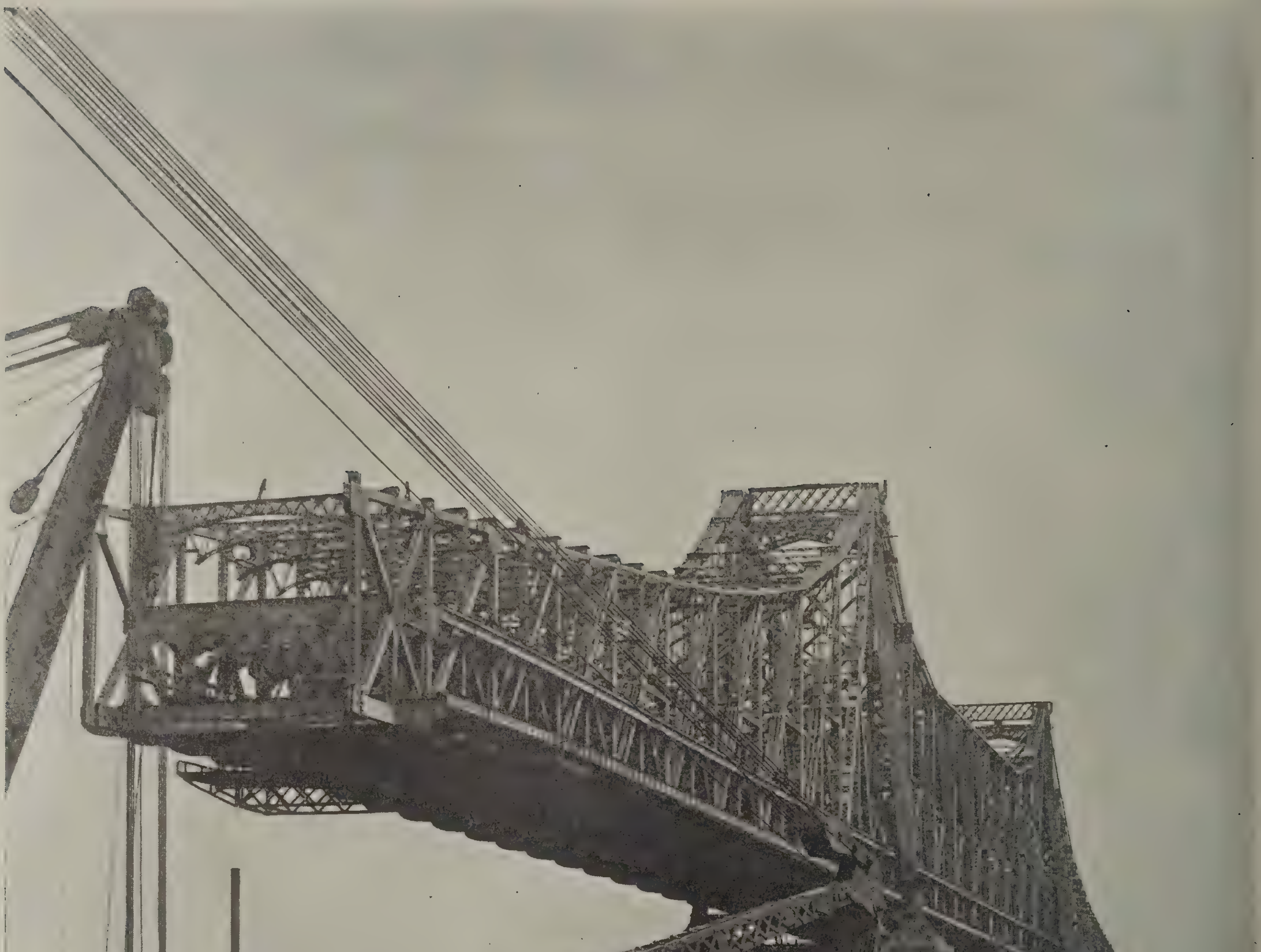
During the twelve months ending with September, 1907, 211.000 copies of the American Exporter were circulated—an average of 17,583 per month.

"Outward Bound"
Boston Harbor



From a stereograph copyrighted 1907 by Underwood & Underwood.

BLACKWELL'S ISLAND BRIDGE, NEW YORK CITY.

Part of the city's bridge system nearing completion. The foundation work of still another bridge is described in this issue. (See page 77.)

AMERICAN EXPORTER

EDITORIAL

The AMERICAN EXPORTER is both an independent and impartial trade journal. Its publishers have no connection with any manufacturing concern, export house or other business except publishing and, hence, have no outside interest to serve. The editorial management is separate and distinct from its business department.

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Copyright, 1907, by Johnston Export Publishing Co.

HON. ELIHU ROOT,
Secretary of State.

CONSULAR IMPROVEMENTS.

The points brought out in Mr. Osborne's article, appearing in this issue, regarding the commercial importance of the improved United States consular service, are worthy of the careful consideration of those who are buying goods from this country. Mr. Osborne's article, which may be taken to be thoroughly authoritative, discusses, very completely, the improvements which the United States Government has made in its consular service recently—improvements which may be made of especial value to the foreigner engaged in business with American firms. As shown by the text of the article, a great many of these improvements are due to the genius and foresight of Secretary of State Elihu Root, whose influence in furthering international commercial relations has been marked, and will undoubtedly have permanent results of far-reaching importance. More than any other Government official, perhaps, Mr. Root's work along this line has been felt.

At the moment of going to press this influence is shown by the reported settlement at last of the differences arising over the Grand Banks fishing situation. It is said that Ambassador Bryce, of Great Britain, and Mr. Root have come to an amicable understanding, satisfactory to both sides, on this vexed point.

OUR LONDON LETTER.

A word of comment may be made on the London letter from the editor of this publication which appears on another page this month.

It is not the aim of the American Exporter to draw comparisons between other countries and its own. The purpose of the paper is to further the progress of the foreign trade of this country, but not to cast disparagement upon the industries or work of any other. The London letter should be considered the frank, outspoken comment of an American business man discussing conditions as he sees them. That there is good basis for his feeling that the British business man does not give America the credit it deserves is corroborated by an article appearing in the London *Phoenix* of August 2, entitled "The Lack of British Enterprise." In the course of this article the following appears:

"The *Phoenix* some time ago especially referred to the case of the American manufacturer of woodworking machinery who sold a planing machine to come to this country. A few months later, being in England, he called upon the purchasers and asked how they liked the machine. He was told that it was giving entire satisfaction. Asking to see it in operation, he was taken into the shop, where it was running at 400 revolutions to the minute. He protested vigorously, and offered to show them how it should be run at 2,000 revolutions per minute. After considerable persuasion they allowed him to belt it up to the increased speed, and the whole staff of the establishment gathered and gazed in wonder at the enormous amount of work done by the machine under his skillful management. Having been thanked profusely for showing them how much more valuable the machine was than they had supposed, he went his way. A few months later, before leaving the country, he again visited the works and found—the machine again running at 400 revolutions to the minute!

"That was a fair illustration of the cardinal difference between American methods and, indeed, between the methods of leading foreign nations, and those of British manufacturers.

"The British engineer and manufacturer resist the standardization of manufactures, a system from which America has derived a large proportion of her commercial victories. In order that manufacturers may have a profit from repairs, the British engineer will sacrifice the consumer—the very worst possible policy! For instance, in the same form of mechanism, a machine which is produced by many manufacturers, each one will introduce a different pitch of thread in the screws or some other modification, to force the consumer to return to him to repair breakages, while the American, on the other hand, combines with his fellow manufacturers and forms a standard, making all these parts equal, alike and interchangeable, and thus showing an 'enlightened selfishness' which brings in a larger profit."

EXPORT STATISTICS.

More than three-quarters of a billion dollars' worth of manufactures passed out of the ports of the United States in the fiscal year just ended. To foreign countries alone the total was 740 million dollars, while to the non-contiguous territories of the United States the value of manufactures sent was 40 millions, thus bringing the grand total to considerably more than three-quarters of a billion against less than one-quarter of a billion a dozen years ago.

Of this three-quarters of a billion dollars' worth of manufactures sent out of the country last year, practically two-thirds went in finished form ready for consumption and practically one-third in partially manufactured form for further use in manufacturing. The figures of the Bureau of Statistics, Department of Commerce and Labor, just completed for the fiscal year 1907, show that of the 740 million dollars' worth of manufactures exported to foreign countries, 480 million dollars were manufactures ready for consumption and 260 millions manufactures for further use in manufacturing, while of the 40 million dollars' worth of manufactures sent to the non-contiguous territories, practically all went in the finished form.

Finished manufactures exported show an increase of about 20 millions over last year and 267 millions over 1897, a decade earlier, while manufactures for further use in manufacturing show an increase of 34 millions over last year and of 162 millions over 1897.

Of this 740 millions dollars' worth of manufactures sent to foreign countries in 1907, 181 millions was iron and steel manufactures; 89 millions, manufactures of copper; 80 millions, manufactures of wood; 78 millions, mineral oil; 45 millions, leather and manufactures of; 32 millions, cotton manufactures; 27 millions, agricultural implements; 22 millions, naval stores; 21 millions, cars and carriages; 18 millions, chemicals, drugs and medicines; 15 millions, scientific instruments; 10 millions, paper and manufactures of; 9 millions, paraffin and paraffin wax; 7 millions, india rubber and manufactures of ; 7 millions, furs and fur skins; while the remaining 100 million dollars' worth is made up of miscellaneous manufactures, chiefly in the finished form.

Iron and steel manufactures form by far the largest single item in the year's exportations of manufactures, the total value of this single group being, as above indicated, 181 millions, against 161 millions last year, and of this total practically 85 per cent. went in finished form ready for consumption. While the details of the year's distribution are not yet completed by the Bureau of Statistics, a comparison of the figures of 1907 with the analysis of those of 1906 indicates that approximately 80 millions of this exportation of iron and steel manufactures went to North America; 50 millions to Europe; something more than 20 millions to South America, and over 23 millions to Asia and Oceania.

Copper forms the next largest item, amounting to 89 million dollars, of which a large proportion went in the partially manufactured form of pigs, bars and ingots, and of this 89 million dollars' worth of copper exported, probably 85 millions went to Europe.

While the destination of all articles composing the 740 million dollars' worth of manufactures exported is not yet shown by the Bureau of Statistics, a comparison of its figures with the fully completed analysis of 1906 seems to justify the general assertion that about 350 million dollars' worth went to Europe, 200 millions to North America, 100 millions to Asia and Oceania, 75 millions to South America, 15 millions to Africa, and 40 millions to non-contiguous territories, and that while about one-half of the manufactures sent to Europe and one-third of those sent to North America went in the partially manufactured form, nearly all of those going to the other grand divisions were finished manufactures.

The table which follows shows the value of each manufactured article or group of articles, exceeding one million dollars in value, exported in 1907, compared with 1897:

Exports of Domestic Manufactures, by Principal Articles, Years Ending June 30, 1897 and 1907.

Articles.	1897.	1907.
Iron and steel, manufactures of	$57,497,872	$181,530,871
Copper, manufactures of	31,621,125	88,791,225
Wood, manufactures of	35,679,694	79,704,395
Oils—mineral, refined	56,463,185	78,228,819
Leather and manufactures of	19,161,446	45,476,960
Cotton, manufactures of	21,037,678	32,305,412
Agricultural implements	5,240,686	26,936,456
Naval stores	9,214,958	21,686,752
Carriages, cars, and other vehicles and parts of	9,952,033	20,513,407
Chemicals, drugs, dyes and medicines	8,792,545	18,220,630
Instruments and apparatus for scientific purposes	3,054,453	14,661,455
Paper and manufactures of	3,333,163	9,856,733
Paraffin and paraffin wax	4,957,096	9,030,992
Fibres, manufactures of	2,216,184	8,308,112
India rubber, manufactures of	1,926,585	7,428,714
Furs and fur skins	3,284,349	7,139,221
Books, maps, engravings, etc	5,647,548	5,813,107
Tobacco, manufactures of	5,025,817	5,735,613
Brass and manufactures of	1,171,431	4,580,455
Gunpowder and other explosives	1,555,318	4,082,402
Paints, pigments and colors	944,536	3,931,988
Soap	1,136,880	3,806,097
Musical instruments	1,276,717	3,252,063
Nickel and manufactures of	726,789	3,218,862
Clocks and watches	1,770,402	3,160,272
Coke	547,046	3,013,088
Glass and glassware	1,208,187	2,604,717
Oils—vegetable (other than cottonseed)	1,614,257	2,476,111
Wool, manufactures of	947,808	2,239,106
Jewelry and manufactures of gold and silver	658,676	2,060,144
Lamps, chandeliers, etc	710,997	1,875,869
Zinc, manufactures of	1,870,104	1,556,704
Lime and cement	143,471	1,277,001
Tin, manufactures of	300,441	1,181,534
Starch	1,665,926	1,126,465
Earthen, stone and china ware	177,832	1,097,000
Marble and stone, manufactures of	1,316,815	981,288
All other articles	10,393,315	31,424,517
Total	$311,243,365	$740,314,557
Total exports	1,032,007,603	1,854,553,956
Per cent. which manufactures form of total exports	30.16	39.92

BOSTON
AS AN INDUSTRIAL CENTER.

Great Distributing Point for Populous Territory—Dominates Large Boot, Shoe, Leather, Cotton and Woolen Goods Interests.

BY ARTHUR G. LYON.

BOSTON has such a world-wide reputation as a center of literature and education that we are prone to forget its importance as a commercial center. There are undoubtedly a great many well-informed Americans who would be surprised to know that Boston has the second largest assessed value of all taxable property of any city in the United States, the sum being $1,289,704,987.00.

Boston is the fifth city in population in the United States and is the distributing center for the greater part of New England and a large portion of Canada. Boston's greatest industrial interest is in the leather, boot and shoe trade, her business in this line being the largest in the country. The city is nearer to Europe than any other Atlantic seaport of any consequence, and is in constant communication by regular passenger and freight steamship lines with London, Glasgow, Liverpool, Queenstown, Hamburg, Hull, and, coastwise, with Yarmouth and Halifax, Nova Scotia; St. John, New Brunswick; St. Johns, Newfoundland; the principal ports of Maine, also with New York, Philadelphia, Baltimore, Norfolk, Savannah and Jamaica. In addition, the city has a very large carrying trade by sailing vessels and tramp steamers to all parts of the world.

Of even greater import, however, is the city's financial interests in ship and rail transportation in all parts of North America. Because of the age of the city, it having been a commercial center of importance before Chicago and other Middle Western cities were settled, its leading business men were instrumental in financing important industrial and transportation enterprises necessary to the development of the newer portions of the United States. Hence, while it cannot be denied that Boston today does not impress the casual visitor as having the hustle and business energy of American cities farther West, the underlying fact is that much of the progress and prosperity of the latter points is in a large part due to the enterprise and foresight of Boston capitalists.

Boston originally was called Shawmut, being settled in 1630. The small, jagged peninsula which John Winthrop and his followers settled in 1630 had an area of only 783 acres. Since then the area of official Boston has grown to nearly 24,000 acres, this increase being the result of filling in portions of the harbor and annexing adjacent towns. The total population of this area is in excess of half a million. As a matter of fact, however, the real Boston, known as "Metropolitan Boston," exceeds the municipal lines, for, lying within a radius of some ten miles of the City Hall, there are thirty cities and towns which are, in every respect except name, part and parcel of Boston. The total population of this Greater Boston is very close to a million people, and it is growing rapidly. There is a very large immigration into Boston and its suburbs.

Included within this so-called Metropolitan Boston are such important cities as Cambridge, separated from Boston only by the Charles River, containing a population of 92,000 inhabitants, the seat of Harvard University, and possessing a very large number of manufacturing plants. Cambridge is noted as being the first place in this country where a printing press was set up, a press having been brought from England in 1639. The first thing printed upon it was "the Freeman's Oath," followed by an "Almanack of New England." Lynn, which is also included in this district, is the second of the suburban cities in population and the largest shoe manufacturing town in the United States. It is also noted for its large electrical interests. Waltham, a famous watch center, is also included.

To return to the matter of increase of official Boston area, the first addition of outlying territory was made as early as 1637, when an island in the harbor was added to Boston and given the name of East Boston. Although this addition more than doubled the area of the old town, it remained a farm until 1833, when capitalists purchased the land and made improvements. In 1904 East Boston was connected by a tunnel running under Boston Harbor, at a cost of over $3,000,000.00. It is a single tube structure of concrete, reinforced by trussed steel, and the length under the harbor is 2,700 feet. The opening of this tunnel has had a marked effect on the prosperity of this portion of the city.

East Boston is a place of piers, warehouses, dry docks and marine railways, with large mills, factories, oil works, fish-curing establishments and immense coal depots. It is in East Boston that the wharves of several lines of transatlantic steamships are located. Immense terminals and grain elevators are located here by the Boston & Maine and the Boston & Albany Railroads. It is claimed that the facilities of these wharves for the receiving and dispatching of immigrants are superior to those of any other American port.

In the beginning of Boston's history and activity it became the custom of the people to speak of the various sections of the town as the North End, the West End and the South End. As the residence sections continued to stretch farther to the south and west, while the business interests became concentrated in the east and south, this section came to be known as the central district. This central district or business quarter is one of the most congested spots in all America, for the narrow streets which sufficed in the days when Benjamin Franklin was a printer there are taxed to the uttermost now, owing to the industrial expansion of the city. To offset this the subway was begun in 1895 and opened in August, 1897. It will thus be seen that Boston preceded New York in building an underground subway for passenger traffic. The Boston subway and elevated system are combined, and trains are run on two loops, so that passengers are transported to various parts of the city with remarkable convenience and speed.

CHAMBER OF COMMERCE.
In the heart of the shipping and mercantile section.

The central district is not only noted as a business center but also because of its many famous old landmarks, the historical associations of Boston being more numerous than those of any other American city, and more nearly equal to those of the leading European cities visited annually by so many tourists. Among these landmarks are the old State House, around which now cluster the leading banks of Boston and the offices of the most active brokers; Faneuil Hall, Quincy Market, the Old South Meeting House and other ancient edifices.

Washington Street, extending in a fairly straight line for several miles straight out from the heart of the city to the suburbs, is the principal retail business thoroughfare, and along it are located the majority of the more important dry goods, clothing, boot and shoe establishments, as well as large numbers of smaller shops catering to the individual consumer. Milk Street is the home of a great many of the leading corporations, and contains a large number of representative office buildings. It is interesting to note that at No. 17 Milk Street is a tablet which marks the site of the birthplace of Benjamin Franklin, in whom all who have been benefited by the wonders of electricity should certainly be interested. Near Milk Street is the Post Office, and within a brief walk is the Custom House, while just beyond, on India Street, a name which recalls the famous India Wharf of London, is the Chamber of Commerce Building.

India Street runs down to Atlantic Avenue, which is on the water front. Here is a large collection of docks and wharves, including the famous "T" Wharf, the center of Boston's fishing industry. It is to this wharf that the fishing smacks come from the Grand Banks with the cargoes of cod. It is interesting to observe the arrival of one of this fleet, as the dealers go out to the end of the wharf, and, while the skipper is bringing his craft in, they bombard him with offers for the cargo. He has usually sold his catch before he leaves the boat.

Near the "T" Wharf is the South Terminal Station, the largest passenger station in America, where 800 trains a day arrive and depart. This station controls the passenger traffic to and from the southern half of Massachusetts, all of Rhode Island, Connecticut, New York, and passengers to the South and West.

The South Station is on Dewey Square, at the intersection of Atlantic Avenue, Summer and Federal Streets, and is jointly occupied by the New York, New Haven & Hartford and the Boston and Albany Railroad companies. Here arrive all passengers from New York and the South or West, except those coming over the Hoosac Tunnel Route or through Canada.

This magnificent station, opened January 1, 1899, is the largest railway terminal in the world, exceeding the St. Louis Union Depot by about ten per cent. of capacity and size. It is an imposing structure of pink Connecticut granite, six stories in height, the upper floors accommodating the business offices of the various railway companies interested. It is the property of the Southern Terminal Company, which uses thirty-five acres of very valuable ground, the buildings alone covering about thirteen acres. The cost of land and buildings is said to have already approached $14,000,000. It was necessary to drive 43,000 spruce piles, and to use in the structure, besides cut stone, enough to cover a front 3,300 feet in length, and to appear elsewhere, about 16,500,000 bricks, 30,000,000 pounds of steel, 5,000,000 feet of lumber, 150,000 square feet of wire-glass, 10 acres of gravel roofing, and other materials in equally vast amounts. The broad corner entrance admits the traveler to the Midway—an open space between the waiting rooms and train-shed large enough for the manœuvering of a regiment. Immense and comfortable waiting rooms, baggage rooms, ticket offices, restaurants, a covered carriage stand, etc., open off from this, with the most complete modern appliances of all sorts. The train-shed, outside of this, is a space 600 feet square, spanned by a steel and glass roof supported upon three arches of steel trusses, the middle one of 228 feet span. This shed contains 28 tracks side by side, and can accommodate at once 344 sixty-five-foot passenger cars, able to seat 28,000 persons. Over 700 trains will regularly use the station daily, when all are arranged for. In addition to this main floor there is a basement, or subway floor, intended mainly for suburban and excursion traffic, where four tracks are laid in loops, so that trains can follow one another with great rapidity, enabling crowds to be handled with greater celerity than anywhere else in the country. The vast yard beyond the station terminates at the Fort Pond Channel, which is crossed upon the greatest steel roll-lift bridge in the world.

LOOKING EAST FROM BOSTON,
Showing Faneuil Hall, Quincy Market, the harbor and East Boston Elevators.

The North Station, on the other side of the central district, is used by the passengers going to and from the northern half of Massachusetts, New Hampshire, Maine, Montreal and the eastern part of Canada.

STATE STREET.
The tall buildings contain the leading banking and brokerage offices.

South Boston is a great industrial center, having vast establishments in which naval cruisers are built and heavy ordnance made; immense cordage works, car-wheel works, elevator works, oil works, sugar refineries and breweries. These establishments are mostly along the water fronts on the northern and southern sides. In the neighborhood of the Congress Street Bridge from the city proper are the Atlas stores, huge warehouses, the terminal piers of the New York, New Haven & Hartford Railroad, and foreign and coastwise steamship docks.

Charlestown was annexed to the city in 1873, and, while smaller in area than some of the others, is one of great importance. Here is the famous Bunker Hill Monument, on Breed's Hill, where the battle celebrated in song and story was fought.

The Navy Yard's present area is about eighty-seven acres, and within the enclosure are large and costly buildings. There are extensive parks for cannon and shot, a parade ground, marine barracks, store and ship houses, arsenal and magazine, a hammered granite dry dock and a long rope walk. This Navy Yard is one of the most important in the country.

Also located at Charlestown are the docks of many of the transatlantic lines to Liverpool, Queenstown, Hull and London.

The other annexed districts of the city are almost entirely used for residential purposes, although Roxbury has a good number of factories. Boston is peculiar in that only a small fractional number of its workers live in the city proper. The vast majority live in the suburbs, and the community spirit is, therefore, one essentially homelike. With the exception of the exclusive Back Bay district, along the banks of the Charles River, where the finest homes are located, there are few of Boston's residents who do not enjoy all the pleasures of suburban life, with good air and ample grounds, yet are within a few moments of the heart of the business district.

The chief industrial interests of Boston are due to the fact that she lies in the center of the largest boot and shoe manufacturing interests in the world, one of the largest cotton mill districts in the world, and also is the center of important woolen mill interests, leather and fish-curing industries, and is the distributing center for many products to Nova Scotia, Canada, Maine, Massachusetts and Rhode Island. Hence Boston is an enormous jobbing and retail center, and great quantities of goods which are manufactured at a lower price in the West than they could be made for in Massachusetts are marketed at this place.

As a manufacturing center Boston is noted for quality rather than quantity. Its factories are especially successful in manufacturing the finest grades of machinery, tools, hardware, electrical supplies, boots, shoes and clothing. The city is so near the lumber forests of Maine and Canada that a dominance in many lines of household goods and woodenware is natural. The city's exports of boots and shoes outrank those of any other American city. Her exports of woolen goods, cotton goods, hardware, tools and electrical goods are also very large. Owing to the ease of shipment to Europe from this port, the city handles an enormous quantity of goods for transshipment.

FISHING INDUSTRY.
Fishing schooners at the "T" Wharf.

TWO GIGANTIC CONCRETE JOBS.

I.—The Manhattan Anchorage for Brooklyn Bridge No. 3.
II.—The Jones & Laughlin Steel Plant.

Showing How the Tremendous Volume of Concrete Is Mixed and Handled Economically and Rapidly by Means of Construction Plants Carefully Designed in Advance.

BY CHARLES M. RIPLEY.

Two typical concrete installations, together with the contractors' method of transporting, mixing and handling the concrete, and notes on excavating and pile driving, are here described.

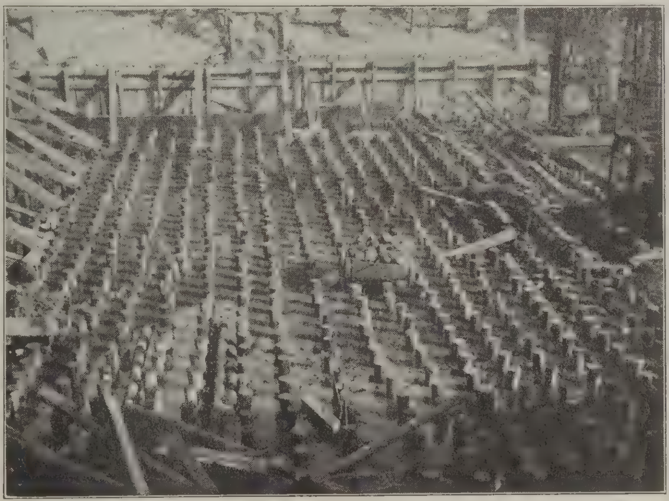
The essential elements of interest in the two plants are brought out, and readers can judge for themselves the especially meritorious points in connection with each.

Attention is called, however, to the fact that gravity has been employed to a great extent in both of these plants—in one for the transportation of stone and concrete in a horizontal direction, and in the other both for the handling of materials at the concrete mixing plant and also for the switching arrangements of the cars which carry the concrete to the job.—EDITOR.

PART I.

THE MANHATTAN ANCHORAGE FOR BROOKLYN BRIDGE NO. 3.

Bringing Out the Remarkable Fact That Nearly One-half the Cost of Constructing This Steel Suspension Bridge Is Being Put into Masonry; and That Over Seventy-five Per Cent. of the Masonry Is to Be Concrete.



Courtesy of *Engineering-Contracting*.

A BEAUTIFUL JOB OF PILE DRIVING.

It is a matter of considerable interest to those in the cement and concrete industries to note that of the entire cost of the new steel suspension bridge over the East River, New York City, to be known as the Manhattan Bridge, or Brooklyn Bridge No. 3, nearly half is to be expended for masonry. Still more striking is the fact gathered from an analysis of the estimated cost that nearly 88 per cent. of this masonry is concrete. Is any better proof needed of the onward march of the cement industry? The following extract from the specifications in the Department of Bridges, New York City, is the authority for the above statement: Of the $19,651,000 which this bridge is to cost, $6,281,000 is allowed for the cost of real estate necessary for the abutments, approaches, etc. The remaining $13,370,000 is distributed as follows:

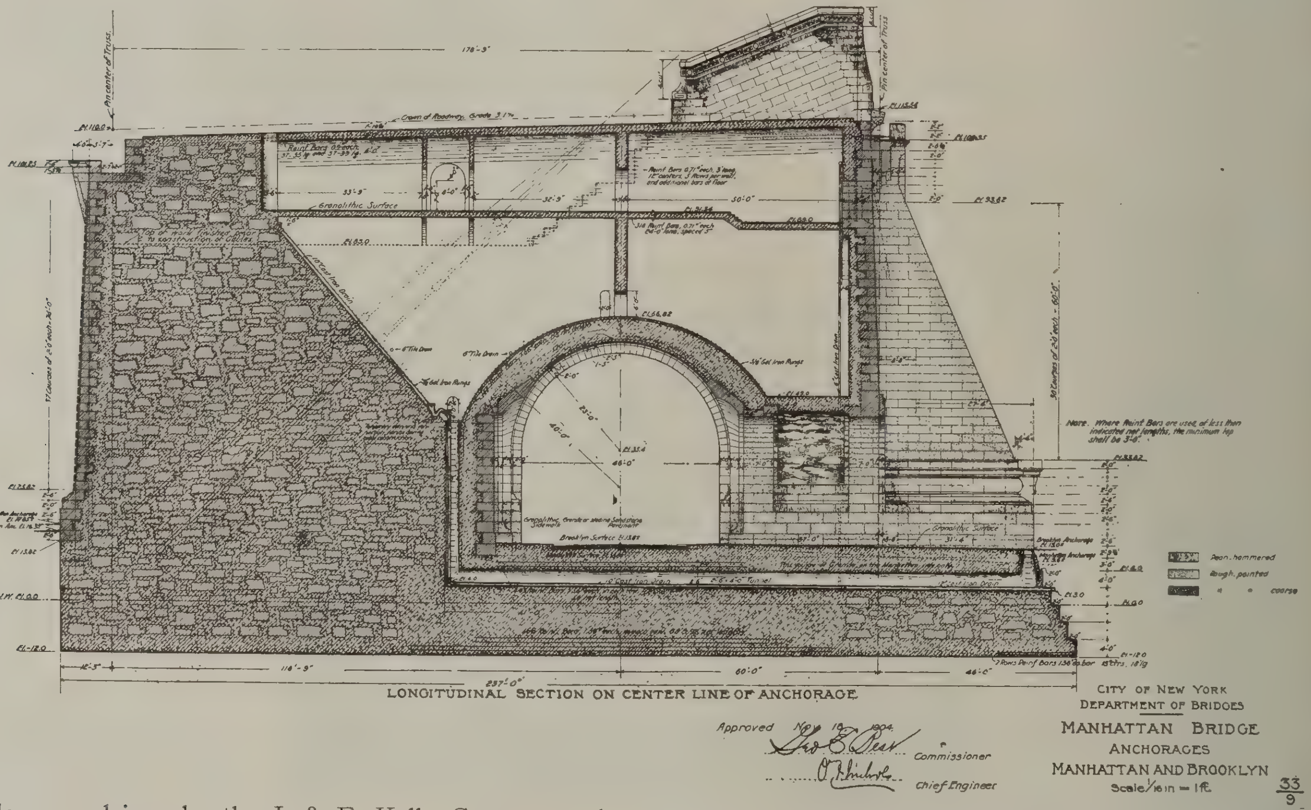
River spans, steel superstructure, complete...	$6,500,000
Masonry, piers and foundations............	3,500,000
Approaches	2,500,000
Engineering contingencies................	870,000
Total............................	$13,370,000

The entire volume of masonry in the anchorage is approximately 114,000 cubic yards. Of this total 42,000 yards are of ordinary concrete and 57,000 cubic yards are of the "cyclopean" masonry, a term applied to concrete containing large rectangular blocks of stone over a half cubic yard in volume. It is to be remarked that the figures just enumerated are in regard to the masonry in the Manhattan anchorage. However, since the towers are to be of steel, and the tower foundations only about one-fifth the area of the anchorage, the proportion of concrete in the anchorage can be assumed to be correct for the remainder of the bridge. It is further to be borne in mind that a great proportion of the tower foundations themselves are to be of concrete, as well as the pavements of the bridge itself, the approaches and terminals.

Never before in the history of civil engineering (with the exception of the Pyramids of Egypt) has a volume of masonry as great as this been placed within an area but 218x220 feet. In addition, as shown by the bridge department drawing herewith, this bulk of masonry is pierced by an archway to allow the Cherry street traffic to pass through. This arch is 46 feet high and 46 feet wide, and is constructed of reinforced concrete. The great Croton Dam, part of New York's gigantic new water system, has, of course, a greater volume, but is distributed over an area many times greater than this. The Washington Monument, while small in cross section and 555 feet high, still fails to exceed in volume the Manhattan anchorage.

The preliminary construction work necessitated tearing down a portion of a seven story brick building. This portion was shored up first from the inside with timbers at every story, these being placed just without the borders of the condemned portion to be wrecked. The razing was then carried on, and when completed piles were driven immediately around the site of the anchorage. On these a new wall was constructed which held up the lower ends of the wall beams of the old building. After this was done excavation could be carried on without fear of collapsing owing to the wet sub-soil of this portion of Manhattan Island—the sea level being less than 18 feet below street level. See drawings.

Sheet pilings 12 inches thick and from 20 to 30 inches wide were driven by the J. & F. Kelly Company, who were the sub-contractors for the foundation. These 4,430 piles were put down by four drop machines with 3,500-pound hammer in 45-foot leads, and one 4-ton and one 5-ton Vulcan steam hammer. In only a few cases was the water jet necessary, the soil on this side of the East River being comparatively free from boulders. See test borings in drawing. During the entire excavation work so carefully were the sheet piles driven that one Lawrence centrifugal pump was sufficient to keep the excavation dry. The piles were on an average of 25 to 30 feet long, 14 inches at the banded head and 9 inches at the point. The excavation was carried on by means of a force of 200 men with picks and shovels, the material being hoisted by means of five 1½ yard buckets of the orange-peel and clam-shell types, and by means of seven Excelsior bottom dumping buckets. Thus the excavation was carried down to a level of —18 from M. H. W., or about 29 feet below street level. The piles were driven to a refusal of ¼ inch, and the work was so arranged that 16 piles were driven in ten hours by each machine each day.



LONGITUDINAL SECTION ON CENTER LINE OF ANCHORAGE

THE CONTRACTOR'S PLANT.

The contractor for the anchorage was of the opinion that the overhead cable would not be the most efficient means of transporting material. Instead, a combination of the industrial railway and the belt conveyor, self-contained in the same elevated trestle, was employed. All the material was brought to the slip in the East River by barge (trucking being eliminated), and hoisted by grab-hooks or clamshell buckets up to the level of the cars on the trestle. The highest point of the viaduct is about 35 feet above the street level. On the top were run the industrial railway tracks, while about 12 feet below was suspended the belt conveyor. This belt was ⅜ inch thick, 24 inches wide and about 1,700 feet long, of the type known as the Robins troughed belt. This was capable alone of transporting 1,800 cubic yards of material in ten hours, and was propelled by an Olney & Warrin engine of 30 horse power. Under the belt were run the steam pipes supplying the two hoisting engines at the water front.

Also contained in the elevated structure were the boiler house and the duplicate sets of bins for the storage of coal, sand, ¼-inch trap rock, and crushed stone. The bottom of these bins contained steam pipes which in cold weather prevented the freezing of material. The stone cut and also the rough hewn cyclopean blocks were hoisted by one hoisting engine, which engine also lifted the bags of cement, into the cars of the industrial railway.

Another hoisting engine further out on the dock, by means of the Hayward clam-shell bucket, hoisted the fine coal, sand, ¼-inch trap rock and crushed stone, and deposited them in the hopper of the belt conveyor, where they were fed by hand onto the conveying belt. This material was dumped automatically by a patented device, falling into the proper bins before described, near the mixer and about 1,000 feet from the East River.

Courtesy of *Engineering-Contracting.*

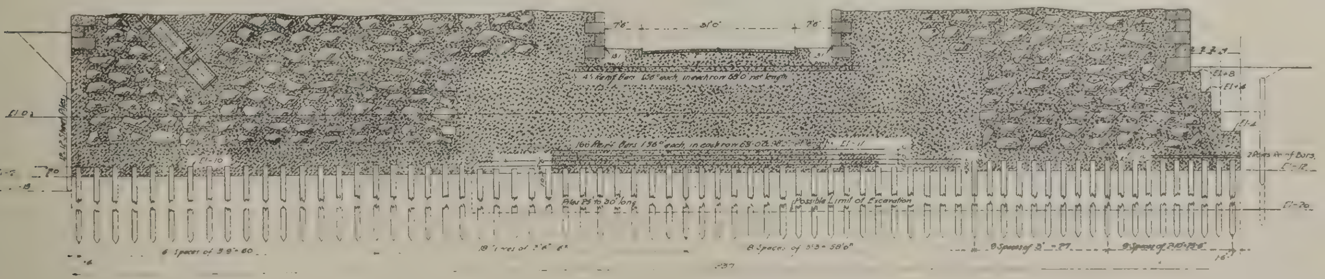
VIEW OF STONE YARD.

These bins are arranged in duplicate, one set for sand, crushed stone and trap rock, together with one for coal, being located to the east of the mixer—the side nearer the boiler house and the river; a similar set of bins (with the exception of of the one for coal) is located to the west of the mixer.

The bottoms of these bins contain doors or gates, specially constructed by the Stuebner Iron Works, these being about 6 feet above the double tracks of industrial railway which lead up from either side to the "charging pit." One track passes directly under the two sand bins and the other track under the two stone bins. The cement is stored in a nearby building. By referring to the photograph it will be noticed that the skip hoist which supplies materials to the mixer is just in the act of beginning the discharge of its bucket into the mixer. At this part of the "charging cycle" a second bucket is down in the charging pit receiving its load from the measuring cars, as those are called which operate under the bins. The advantage of the double set of bins, measuring cars and charging cars is the almost continuous operation of the mixer; for one set can be filling, charging and dumping while the other set is measuring preparatory to repeating the cycle.

The sand-measuring cars are of steel, hold 30 cubic feet, and discharge through a chute in the side, which leads charge straight into the pit where the charging car is lowered. The stone-measuring cars have a capacity of 60 cubic feet, and dump by having one side swing out on a horizontal axis near the top of the car. The charging cars are operated on the skip by one hoisting engine, in a manner quite similar to the blast furnace hoist.

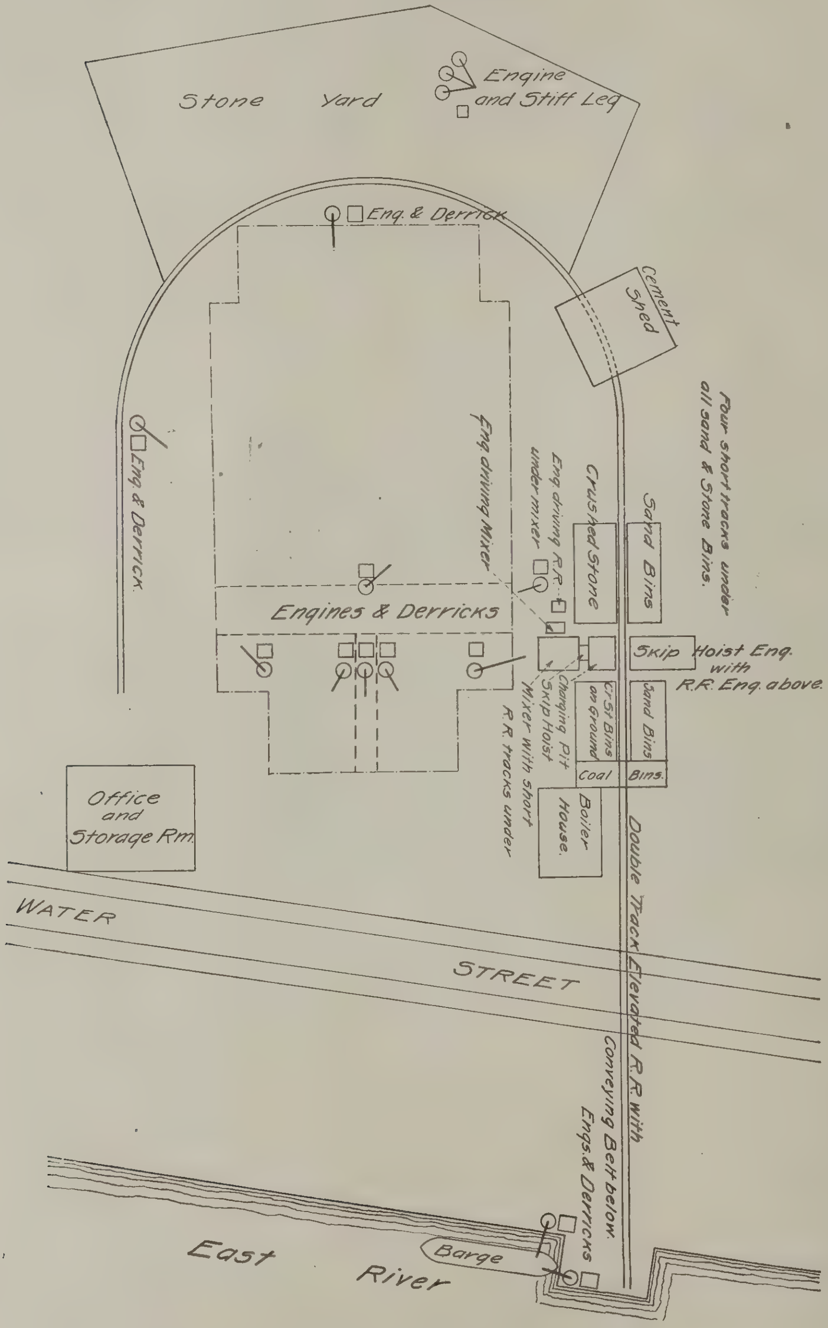
The mixer, which sometimes turns out as much as 550 cubic yards per day, is known as Carlin's Cube Mixer, is made in Allegheny, Pa., and is driven by a 20 horse power Olney & Warrin engine by means of a 46-foot Clouser link chain belt, made by the Link Chain Belt Company, New York. Since the mixer discharges by gravity, it must be at an elevation considerably above the level of the buckets which are to deposit the concrete; the long chain drive was used largely so that the engine could be set up on the ground. The amount saved by doing away with scaffolding for the engine was many times the cost of the drive. Further, Mr. Williams says that in the past an annoying source of delay has been the continual taking up slack in leather belts which cannot drive without slipping when exposed for any length of time to the splash of cement and concrete and the rain. The intermittent shocks due to the irregular tumbling of the mixers' contents make necessary a drive that is without the possi-



CROSS SECTION.

bility of slippage. The present arrangement has been operating satisfactorily for eighteen months.

During cold weather a very quick setting cement was used, and in addition steam and warm water were used in the mixer so that setting would occur before temperature had dropped to the freezing point.



GENERAL PLAN OF JOB.

The Williams Engineering and Contracting Company are building the Manhattan anchorage. One of the special stipulations in their orders for cement is the time for setting, which changes according to the season.

About twelve revolutions of the mixer are generally sufficient, after which it dumps into another bucket of the bottom dumping type. These were used previously in handling excavated material, and are now employed in the delivery of concrete to the forms. It was found that one engineer and one man to direct the exact point of dumping were sufficient to operate a pair of buckets, one being filled while the other was being swung into place. Mr. Williams says the sharp angle formed by the bottom of the bucket in the dumping position made the work rapid, as no time was wasted and no extra men were required with shovels to scrape the concrete off the bottoms. It is also to be noted that very thick layers of concrete were laid, the danger of distorting the sheeting not being so great with the bucket used as with the old kinds, where the "head room" required necessitates the contents of the bucket taking a plunge of several feet when being dumped. In laying concrete the bucket could be let down almost into the forms while dumping owing to one feature in its construction.

One of the photographs shows the concrete arch with a 46-foot span, in the intrados and extrados of which are found reinforcing bars of the Concrete Steel Engineering Company's "Thatcher" type.

The industrial railway mentioned above and shown in the photographs, in addition to extending down grade from the bins to the water front also runs down grade in the opposite direction and encircles the job. Located at proper intervals along the track were the derricks, six in number, which, with 90-foot booms, commanded the railway and the entire site both for excavating and for depositing masonry, cyclopean blocks and concrete. Oregon pine booms were used, about 16 inches in diameter.

A CLEVER RAILWAY DESIGN.

One hoisting engine with but one engineer operated the entire industrial railway system as follows: Since the double drum engine was located at the "hump" in the track, as shown in the photos, cars can descend in either direction by gravity, being controlled by the brake band on the particular drum on which the cable to either downward moving train is wound. Or the cars can be made to ascend in either direction on either track by winding up both cables simultaneously, the two cables being dead-ended, one in each train. It is well to note also that one train can ascend on one track while the other train can descend either to the east or to the west of the job, since the operation of the two drums is independent. The track is double for a distance of about 1,500 feet. Another admirable feature is that while there is an equivalent of 3,000 feet of single track, there is but 1,500 feet of cable, about 750 on each drum. Since cables are dead-ended half of the entire track is free from cable all the time, thus reducing chances of accident from that cause to a minimum. After each cable leaves drum it passes under track, up under idlers, and then either to the east or to the west around other idlers, according to the way the train, to which it is attached, is started. These cables were part Waterbury, part Weschen, part Roebling and part Bascom. All the derricks were equipped with the Lockport block, and were operated by a total of eleven National hoisting engines.

Mr. Williams says one of the derricks on the job was so arranged at the beginning of the work that without changing its position in several years it has handled over 70,000 yards of material, part in excavation, part in masonry and the rest in concrete. It enjoys a reputation that perhaps few derricks in the world can boast of, and is still in the identical spot upon which it was placed in 1905, and will remain there for a time in the future, completing the masonry. This is, of course, a matter of no little importance to the contractor, for the time and expense for labor, as well as chance for damage in frequent changes of machinery, are a considerable loss. Among this same line it will be noticed in one of the photographs that two engines are located on a platform suspended above one of the street openings through the anchorage. Here again the contractor has allowed for increase in the size of the structure with no change in position of these engines for months to come. In addition one of these engines operates a derrick about 90 feet distant in a direction away from the boiler; the engine is kept close to steam supply to prevent excessive loss in pipes in the winter. Being hung over the street, the leak of oil is prevented from spoiling appearance of masonry or jeopardizing the bond in the concrete on which it might otherwise have fallen.

THE ONWARD MARCH OF CONCRETE.

The claims of those interested in the future of concrete and cement in the engineering field have been very well substantiated by a careful trip over this plant. It has shown conclusively that a plant for a concrete job, if well laid out in the beginning, can be operated with unskilled labor at comparatively low cost for all kinds of concrete work, from pavements up to huge structures.

The construction of this bridge is one of several enterprises looking toward the improvement of communication between the island of Manhattan and those portions of New York City situated on Long Island.

The first of these, the famous Brooklyn Bridge, is architecturally the most attractive. It was followed two years ago by the completion of the Williamsburgh Bridge, a steel structure, while the Blackwell's Island Bridge, which will connect Manhattan Island with Long Island City, is rapidly nearing completion. This is also to be a steel structure.

Owing to the enormous increase of traffic between the two islands, however, bridges are not deemed sufficient, and two subways under the river are in process of building. The completion of these various bridges and subways, together with the tunnel under the North River, building now, by the Pennsylvania Railroad, will give New York City an unexampled series of communications for rapid transit purposes.

Courtesy of *Engineering-Contracting.*

VIEW OF EXCAVATION.

PART II.

Preliminary Construction Work on the New Jones & Laughlin Steel Plant, Aliquippa Park, Pa.

THE contractor's plant at the above job is of interest mainly for the reasons that: (1) Excavation work for the blast furnace foundations was done by steam shovels; (2) the gigantic amount of concrete to be laid was over a widely distributed area, some places one mile distant from the mixing plant; and (3) the natural topography of the ground was taken advantage of in laying out the concrete mixing plant.

DELIVERING THE CONCRETE.

EXCAVATION WORK.

The size of the plant ultimately, the writer is informed, will be ten blast furnaces with all accessories. The amount of excavation for each blast furnace is approximately 15,000 cubic yards, making a total of 150,000 cubic yards for the furnaces, and not taking into consideration the boiler house foundations, blower house, bloom mills, etc.

It will be of interest to contractors to note the results and low cost of steam shovel work for such excavation work. The cut (Fig. 1) shows roughly the layout of excavation for a pair of blast furnaces, and the broad gauge railroad track, where a Marion steam shovel with 2½-yard dipper, and a Bay City shovel with 1-yard dipper, passed through, digging in front and on either side. The large shovel was handled by three men, each at approximately $4 per day, assisted by four tracklayers at $1.50 a day each. The smaller shovel was manned by two men at $4 a day each. There were also four more tracklayers working in connection with this shovel.

The cars for excavated material were of the ordinary broad gauge flat railroad kind, owned by the parties doing the work, and holding approximately 16 yards each. Fifteen of these are being used in the work, and a shovel gang of eight men is provided for the unloading of each car. The average length of haul of dirt is 1,000 feet to a fill that is being made, and of the total of five locomotives used by the substructure contractors three are used to haul these flat cars. The other two, H. X. Porter locomotives, are used to deliver materials to the mixing plant and to haul flat cars with Excelsior bottom dumping buckets containing concrete from mixer to the place for depositing.

The first two furnace excavations were completed by the above method in six weeks, or about 5,000 cubic yards per week. Each excavation pit was 300x75 feet, and was carried to a depth of —18 with reference to ground level. One of the great elements in reducing cost of this work was the fact that no water or water-bearing strata were encountered, and hence no pumps were required and no time wasted from this score. Neither were any piles needed for foundations, as a very hard, firm gravel suf-

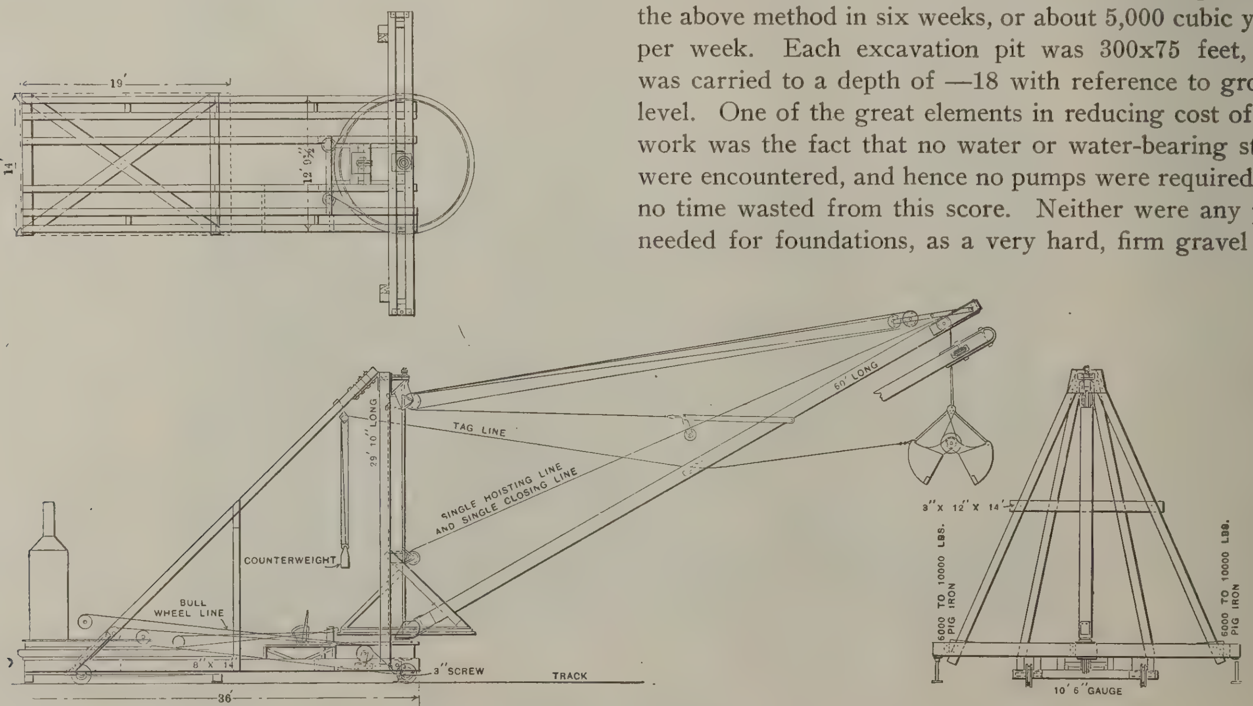


FIG. 1.—SHOWING THE STIFF LEG DERRICK FOR DELIVERING CONCRETE AT DISTANCES OF 60 FEET FROM EITHER OF THE DOUBLE DERRICKS.

ficed for this, and further did away with the necessity of sheet piling entirely.

(2) The Mixing Plant.

As seen from the sketch (Fig. 2), the 40-foot hillside was taken advantage of in saving all hoisting expense. The expense of a skip hoist with engineer or gang of shovellers was done away with, and all trucking also was dispensed with, inasmuch as the top track brought all materials direct from the siding, and the bottom railroad tracks took concrete direct to the job, as shown in Fig. 5. The gang consisted of one foreman and engineer, the same man acting in the double capacity at about $3 per day, and fifteen laborers at $1.50 per day. These men, with two Smith No. 5 mixers, driven by the standard engine (about 19 horse power), turn out approximately 400 cubic yards per day of concrete, proportioned 1 to 3 to 5. Of late the concreting has been going on night and day, and 800 cubic yards for the twenty-four hours is not an unusual record.

Dragon Portland cement, of the quick-setting class, is used on the job, and is delivered in cars, as shown in Fig. 2. The steam to supply mixing engines, and also water pump a few hundred yards away at the water front, is less than 100 horse power, and is tended by one fireman. Since gravity is used in all handling of materials, the requirements for steam are very limited. There are three tracks upon the top of the trestle work in Fig. 2.

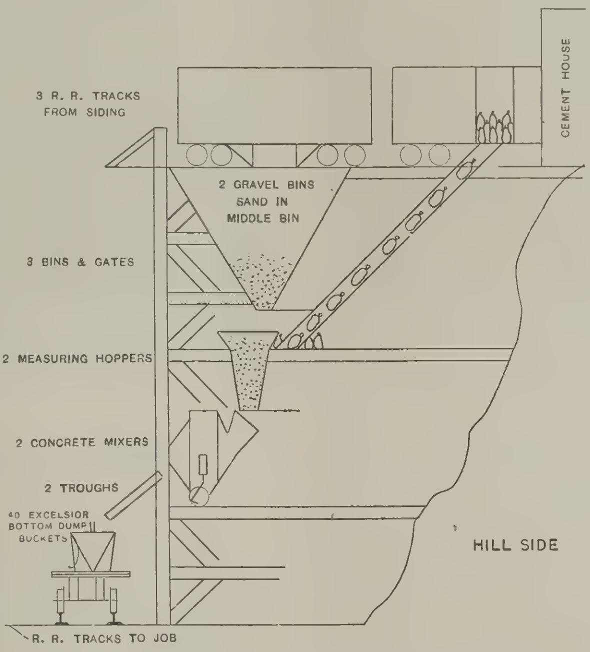


FIG. 2.—ELEVATION OF MIXING PLANT. HOISTING OF MATERIALS ELIMINATED AND GRAVITY TAKEN ADVANTAGE OF.

The trestle work was made of 12x12 timbers, and was approximately 40 feet in height. It needs explanation that the trestle work contains three bins, each bin lying under a track, the outer two being for gravel. One discharges into the measuring hopper of each mixer; the inner or middle bin, situated between the gravel bins, and of the same size as one of the gravel bins, is divided into two parts by a partition extending vertically, each part feeding sand to one of the mixers. Thus three bins feed two kinds of materials to two mixers. The cement bags are sent down two wooden chutes at either side of the middle track. The two outer tracks deliver gravel to the bins below them, and the inner or middle track delivers sand to the bin below it. The middle track also is used for delivering cement to the chutes as mentioned above.

(3) Delivering Concrete.

An admirable feature of this mixing plant is that one locomotive is more than able to deliver concrete to the several different locations where it is being laid, and which are widely scattered. This is made possible owing to a very ingenious expedient, which can be understood in connection with Fig. 3. The switching and shifting of cars in and about the neighborhood of the mixer is done entirely by gravity, thus leaving the locomotive nothing to do but drop its load of empties at one location and pick up the loaded cars at another location. By noting the direction of the arrows, which denote down grade, it will be seen that by chocking the wheels cars can be sent from point where dropped by engine to point of loading, where wheels are again chocked while buckets are being filled. Then releasing the wheels will cause car to run down incline to the point "B," where the grade is reversed and an automatic switch allows car to descend in the opposite direction to the point where they are again taken up by the locomotive.

Trains of two cars are used, each car having five Excelsior bottom dumping buckets. The superintendent said that only one man was needed to operate the buckets, it being easy to both open and close them, owing to the construction.

The bucket, forty of which were used to deposit the concrete in place, is peculiar in appearance owing to the V-shaped trunnions which are used to support the bottom in its closed position. By referring to the cut herewith the movements of these three trunnions can be understood.

In order to dump the bucket a slight upward pull on the handle, which is attached to the right-hand link or trunnion, throws the upper end of the second link beyond the center of the right link. This releases the toggle joint

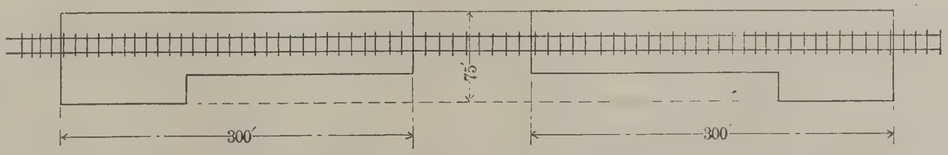


FIG. 3.—PLAN OF FOUNDATIONS AND RAILROAD TRACK.

effect and the middle link begins to move toward the left, at which time the left-hand link begins to rotate about its upper axis.

While these motions are continued the bottom of the bucket has been undergoing two separate motions: First, it has been transported clear over to the left side of the bucket; and second, forced around by the weight of the material being dumped, it has made almost a quarter turn on its center axis and stands practically vertical. As shown in the cut, this has rendered the bucket practically bottomless, and it is this steep angle formed by the bottom which it is claimed greatly expedites the work and makes it unnecessary to scrape the mud, clay or concrete from the bottom of the bucket. Material can be gently deposited under water by this bucket by means of a rope reaching down to the handle.

By referring to Fig. 3 again, it will be seen at a glance how the buckets were transferred to the job from the car. Since the work lay a considerable distance from the car, two special hoisting engines and derricks were gotten up by the Carlin Machinery and Supply Company, which were of the stiff-leg variety. These embodied several new features. The most important of these features are as follows:

Owing to the limited space the gauge of these derrick cars was made 10½ feet and the complete equipment 36 feet long. The A-frame or front support for the derrick mast is, however, 28 feet wide, with Duff screw jacks for supporting from ground after car is moved to position.

A novel and substantial method of securing the top of mast sufficiently ahead or in front of the A-frame is shown in the drawing so that the 60-foot boom of the derrick would travel through an arc of about 190 degrees.

The machinery is designed for operating a 1-yard Hayward clam-shell bucket, using an 8½x10 inch Lambert special hoisting engine with three friction drums and special boom-swinging attachment wherein two small drums were used, permitting all lines to clear each other freely by the original method of placing the sheaves at bottom of mast.

The derrick base proper is made in three parts: Base plate having large surfaces for securing to timbers, the derrick base proper, which forms a seat for mast, and the removable knee or boom seat. This base has ample clearance for three ropes, its bearings being 11 inches in diameter. The knee can be readily replaced without materially disturbing any of the other parts of machine.

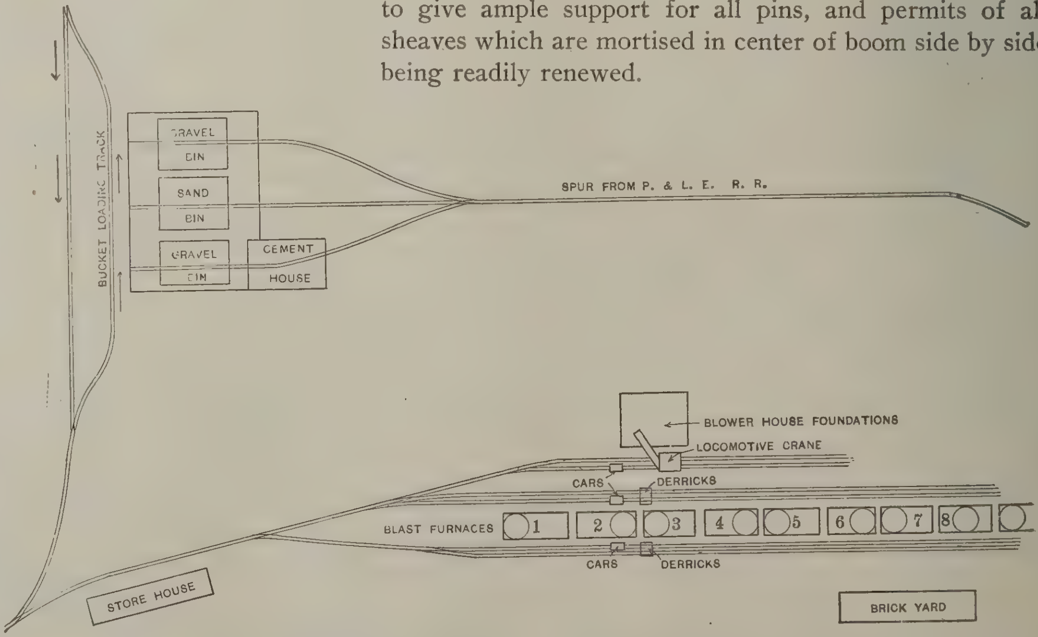


FIG. 4.—GENERAL PLAN OF CONTRACTOR'S PLANT, SHOWING HOW CARS CONTAINING BUCKETS FILLED WITH CONCRETE ARE BROUGHT ADJACENT TO THE JOB.

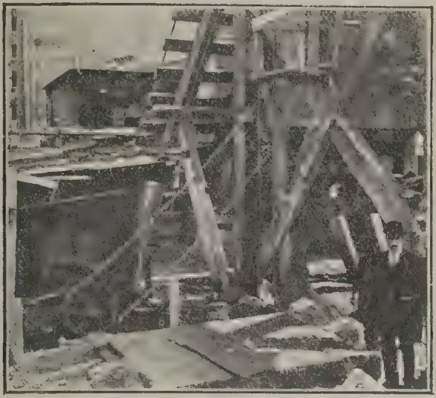
The improved mast top, in addition to forming a support for the gudgeon pin, which is in front of the mast, allowing mast timber proper to be perfectly vertical so that it can readily be plumbed and the top and bottom bearings in perfect alignment, also cares for three sheaves for properly lacing the boom raising rope. And the sheave pin, in addition to its bearing in the casting, is further supported by heavy steel stirrups passing through top of mast with washer plates on back.

CLOSE VIEW OF MIXING PLANT.

The turntable or bull wheel in this case consisted of a simple angle iron rim filled in with wood braces.

The long boom is partially supported by the boom bail secured by the end of the boom line, which has two supporting sheaves built into it for carrying the hoisting and closing lines.

A simple and novel set of irons is made for the boom top lift, consisting of a long steel plate covering the two sides of boom and passing around the end with a built up double block for lacing the ropes, and is so designed as to give ample support for all pins, and permits of all sheaves which are mortised in center of boom side by side being readily renewed.



DRIVING CONCRETE MIXER BY ENGINES, THUS SAVING SCAFFOLDING LOCATED ON GROUND.

A simple counter-weight is furnished for preventing the bucket from turning and twisting the bucket lines, which has ample range to permit of bucket digging 30 feet below derrick.

The main use of these derricks at the present time is in depositing 800 cubic yards of concrete every twenty-four hours, working night and day. This concrete is dumped direct inside of the circular brick exterior walls of the blast furnace foundation.

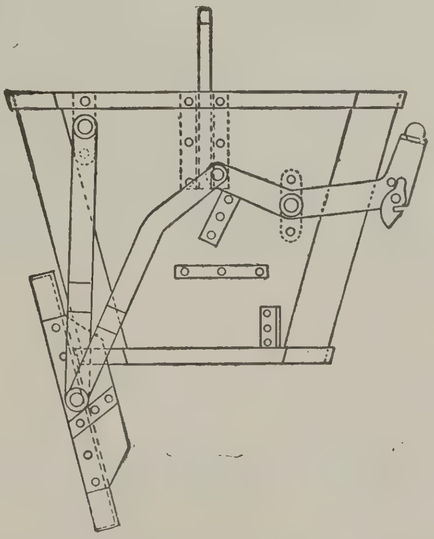
HOW ONE MAN WORKS BUCKET.

The photographs show the location of these derricks with relation to the blast furnace foundations and also give an idea of the length of the boom. The buckets were lowered so as to almost touch the level of the concrete already in place, and there was almost no splash, and hence little danger of straining the retaining walls.

The amount of concrete for each of the ten blast furnaces is about 18,000 yards. This is greater than the amount of excavation, but the difference is made up by the fact that concreting will be carried up about 16 feet above the ground level in certain portions of the furnace.

There are to be 15,000 yards of excavation and 3,500 yards of concrete in the arch over Log's Run at the lower end of the plant site. At this place one No. 5 Smith mixer, hand fed, and run by a 25 horse power portable boiler and engine, supplied concrete. Water is pumped from the cofferdam in the run by an Emerson pump, one being sufficient to keep the excavation dry.

Photo shows view of the Logstown Run arch. The course of the run had to be changed slightly in order to straighten it and make the archway a more simple problem. The firm loam soil did not require cofferdam work, and the excavation was for the most part made in the stream, sheeting only being needed occasionally to retain the bank. The water was drained to a sump in one corner of the excavation, where an Emerson pump was installed by being suspended by rope from a wooden frame. The excavating was carried on at alternating sides of the stream, so that all the water of the run did not have to be pumped; thus the pump was never worked to full capacity. After being started in the morning the pump would very quickly empty out such water as had seeped in during the night, and outside of starting no further attention was required during the rest of the day.



PLAN OF BUCKET.

FILLING.

In the neighborhood of Logstown Run, where the concrete arch shown in the photos is being erected, there is to be a fill 47 feet deep, 1,500 feet wide, and for a distance parallel with the Ohio River of at least 1,800 feet; whether there will be more is not decided. A certain amount of the filling work is to be done with slag from the Pittsburg furnaces of the owners, for since the railroads have been charging for conveying slag the matter of a dumping ground has become of even more importance than in the past. The contractors will therefore be cut off from what otherwise would be a fill two or three miles long,

THE ARCH AT LOGSTOWN RUN SHOWING FALSE WORK.

1,500 to 1,800 feet wide, and about 40 feet deep. No contractors' cars of special design are used, but instead eight shovellers to each car are employed to handle the dirt.

The apparatus used may be rapidly summarized as follows:

Buckets—Forty bottom dump buckets.

Derricks—Twenty-two, special design.

Hoisting Engines—Two four-drum.

Locomotives—Five.

Flat Cars—Fifteen.

Track—All broad gauge. No contractors' cars or industrial railroad.

Locomotive Cranes—Two, one for laying concrete and one for roustabout.

Mixers—Three.

Pumps—Emerson with 4-inch discharge. (This was for use in the concrete arch over Logstown Run.)

Steam Shovels—Two.

MOTOR LIFEBOATS ON PACIFIC COAST.

Capt. D. F. Tozier, Superintendent of Construction of the Life-Saving Service on the Pacific Coast, recently returned to Portland after an extended inspection of the Washington coast. He stated that a new station would be built at Port Offord, Wash., and that a radical departure would be the use of motor lifeboats in the Pacific Coast Life-Saving Service. These would be placed at nine different stations on the Oregon and Washington coasts. Speaking of the motor boat for life-saving purposes, Captain Tozier said:

"The only motor lifeboat at present used in the Pacific service was one transferred from an Eastern station to Cape Disappointment, and this has proved a great success. Orders have been placed with Eastern firms for seven new boats, which are now under construction. They will be fitted up in the most modern style for life saving, and equipped with engines powerful enough to force them through the strongest tides and storms. The use of these boats will be a great improvement over the old type, because it will leave the crews fresh for rescue work after they reach a wreck; for no matter how strong a crew may be, they are bound to be exhausted from battling with the waves, and when they arrive on the spot not up to their best."

SUPPLY OF MEERSCHAUM.

Meerschaum, so highly prized by pipe manufacturers, and which has heretofore come from Turkey in Asia Minor, has recently been found in New Mexico, and the extreme scarcity which has characterized its production during the past few years will, according to a report published by the Washington Department of Commerce, soon be at an end. The new mines are located in the Diablo range of mountains, about 20 miles northwest of Pinos Altos, to which a branch of the Santa Fé Railroad runs from Deming. There have been stripped two true fissure veins continuous for 1,500 feet each, in which there is carried between strongly defined walls meerschaum in widths of 20 inches. "All of the veins appearing are vertical in position, and give indisputable evidence that they were formed through the splitting apart of volcanic conglomerate, a theory still further confirmed by the blow-outs and deposits afloat that have been thus far discovered, and finally by the fact that 'kidneys' of pure meerschaum in various sizes are now obtainable from this surface material, although it has been subjected to the decomposing effects of the elements, impregnation of vegetable matter, and the seepage of other minerals in solution into it for centuries." A wagon road is now being built from the mines to Pinos Altos, a distance of 20 miles, and when this is completed the meerschaum will be marketed.

INCREASE OF 1,664,509 BALES.

Preliminary figures for the fiscal year ended June 30 show an increase of 1,664,509 bales, aggregating 887,824,983 pounds, valued at $80,738,997 in the exports of cotton, when compared with the exports of the previous year. The total value of cotton shipments was $481,166,011, representing 8,705,661 bales or 4,516,799,209 pounds, and making a new high water mark in both volume and value.

The exports of breadstuffs for the year, which amounted to $176,029,689, fell off $1,326,326; provisions, aggregating $215,359,247, decreased $17,013,343, and mineral oils, which were worth $79,079,722, declined $1,362,278.

LOCOMOTIVES IN BRAZIL.

Despite the fact that the majority of railways in Brazil are owned by European syndicates and many of the Government lines are controlled to a greater or lesser extent by English or other foreign capitalists, the imports of American locomotives to Brazil have increased sixfold during the past two years.

The imports of locomotives and their parts into Brazil during the past three years have been as follows:

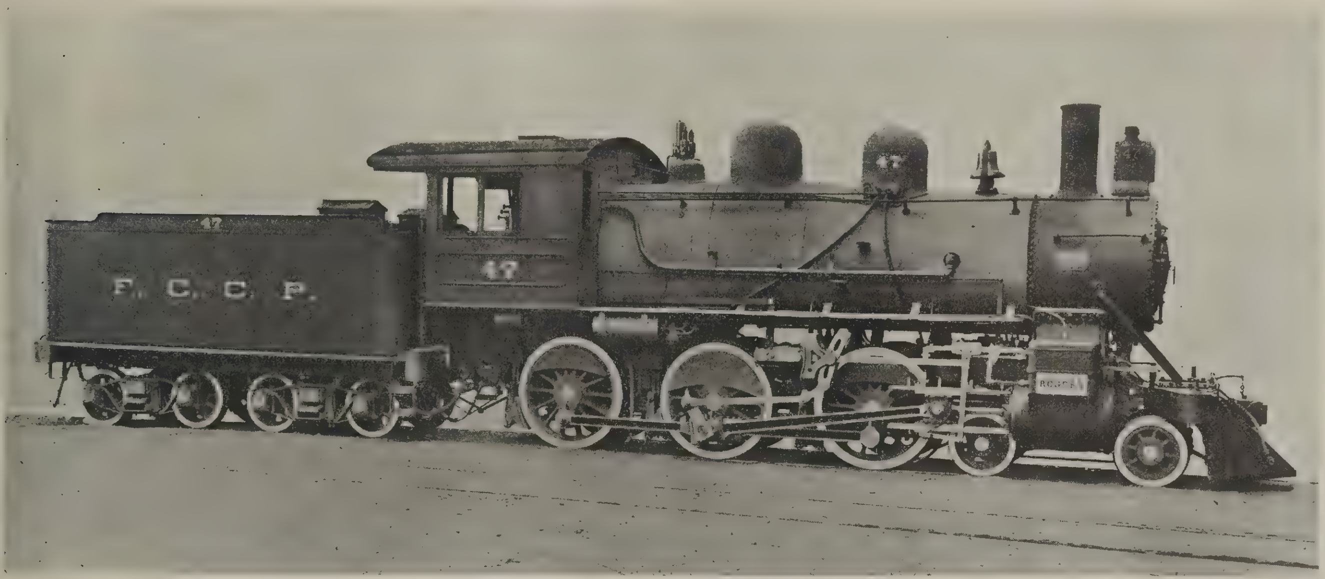
	1904.	1905.	1906.
Germany	$25,179	$16,493	....
United States	124,412	231,420	$783,735
Great Britain	171,847	333,283	247,152
Others	18,541	44,953	69,633
Total	$339,979	$626,149	$1,100,520

It will be seen from this table that while the imports of locomotives into Brazil have trebled in three years, the proportionate portion of the imports from the United States have increased over sixfold, and while the increase in the total imports between 1905 and 1906 was about 75 per cent., the increase in the imports from the United States was something like 250 per cent. As a result of this very large increase in the imports from the United States, Germany fell so far below its former record in 1906 that imports from it are not separately listed. The imports from Great Britain fell off about one-fourth, and allowing for the imports from Germany, the imports from all other countries were of a similar nature.

There are three classes of locomotives used in Brazil in general. Ordinary railway locomotives of varying weight and speed, hill-climbing or cog locomotives for mountain work, and small locomotives for use on railways serving the large coffee and sugar estates, often forming also a connection for a regular railway system in serving a country in general. Of the small locomotives American manufacturers have been furnishing their full proportion, in spite of the fact that some of the largest estates are owned or controlled by foreign capital and naturally disposed to buy locomotives from the manufacturers of the country they represent. Of the cog or hill-climbing locomotives, the American manufacturers are furnishing less than they did. American cog locomotives were tried and preference was given to those manufactured by a single firm in Germany which makes a specialty of that class of locomotives. The American consul doubts if American locomotives of this class had a fair trial, although, of course, in such matters there is room for considerable difference of opinion as to the showing made by them.

Many of the Government lines are leased to companies, many others operated by companies under a guaranty of interest from the Government, with a reversionary interest in the Government, and still many others are owned outright by foreign capital. It is unreasonable to expect that, other things being nearly equal, English railway capital will purchase American locomotives. The English trade in locomotives has been due largely to the fact that most of the railways are controlled by English capital.

On the railroads owned by the Government outright and controlled by it American locomotives have dominated the situation. German and Belgian locomotives have heretofore enjoyed a poor reputation in Brazil. They have been cheap, but they have not been able to stand the test of hard service, for service in Brazil is hard on almost all sorts of machinery for a number of reasons. It is considered very doubtful if the recent orders given by Brazilian railways to Germany will result satisfactorily.



AMERICAN LOCOMOTIVE BUILT FOR EXPORT.

Recent type of locomotive made in this country for a South American railway.

FRENCH BUILDING MATERIALS.

Concrete Being Much Used—Cheap Substitutes for Cement—Mixture and Use of Beton.

BY FRANK H. MASON,
Consul General, Paris.

THE mortar or cement used in France in the construction of barns, outhouses, division walls between properties, storehouses, etc., varies in composition with the district in which it is made and used.

In the neighborhood of Paris such concrete is made by combining plaster, produced by pulverizing the native plaster rock peculiar to this district, with river sand or gravel. This plaster, which costs $3.25 per cubic meter (35⅓ cubic feet), is mixed with coarse sand or gravel in the proportion of 200 kilos (440 pounds) to 1 cubic meter of sand for large thick walls, which are wholly above ground in dry locations. When the wall is to be thin, the cement is strengthened by increasing the proportion of plaster lime to 250 kilos (550 pounds).

Concrete of this kind cannot be used for substructures or foundations exposed to continuous dampness or action of water. For such foundations the mortar used is of ordinary quicklime and sand, strengthened, according to the humidity of location and weight of wall to be sustained, by the addition of hydraulic (Portland) cement, which is also known in France as "ciment de Boulogne," and costs in Paris $15 per 2,204 pounds. The best lime for mortar is known as "Chaux de Beffes," and comes from the Department of Cher. It costs in Paris $7.38 per metric ton.

These kinds of concrete or mortar are sometimes mixed by machinery, but usually the ingredients are combined in an open trough or bed with a hoe and used immediately afterward.

The composition resembling concrete is known technically as "pisé," and is little used in this district, for the reason that one of its principal ingredients is the slag of blast furnaces or some volcanic scoria of similar nature, neither of which abounds in the neighborhood of Paris. In districts where the volcanic scoria or blast-furnace slag is available it is pulverized and mixed with Portland (or Boulogne) cement in the proportion of 400 to 450 pounds of cement to a cubic meter of scoria. The usual method of mixing is combined with that of grinding or pulverizing the slag in a large circular trough around which travel two heavy stone disks driven by steam, water or horse power. The cement and slag, after having been thoroughly ground and mixed, are withdrawn from the mill, mixed with water to the proper consistency, and used at once for the construction of barns, enclosing walls for fields and gardens, and even for ordinary dwellings in villages or the country.

In building division walls with this material a common method is to use a frame or mold, consisting of two planks set vertically and held together by adjustable iron braces, which are lengthened or shortened by set-screws, the space between the two planks being the thickness of the wall. This frame is set upon the foundation, already prepared, and the mortar (pisé) shoveled in and rammed down firmly. The frame is then loosened by the set-screws and raised to receive the next layer of concrete. Walls of this character, especially in buildings, usually receive an outer surface coating of plaster made of finer sand, lime and hydraulic cement.

Formerly stiff clay mixed with straw or tough wild grass was used in country districts for pisé work in the cheapest class of construction, but such walls are available only in dry locations and soon disintegrate under the influence of continued moisture.

Another composition resembling concrete used in France, known as "beton," is thus described:

Lime beton has been in longer and more general use than cement concretes. It was a first-class material when made with ordinary quicklime, and since hydraulic lime has been used it is better. It is a cheaper composition than cement beton or concrete, easier to work, and if the initial load be not too great it is for nearly every purpose just as good. A good lime beton can be obtained by mixing mortar and stones, gravel or cinders, mortar and good-sized stones making the best composition. Probably one-half of the houses in Marseille have been built of this material, and thousands of the older buildings, many hundred years old, are held together by ordinary lime. Walls built of quicklime beton must be laid up slowly, but with hydraulic lime beton they can be erected as fast as masons can work. The solidity of lime beton construction is shown by the sea walls and docks in Marseille, where masonry of this kind may be seen both above and below sea water, the most difficult test to which building material can be subjected.

The lime is weighed out to the cubic unit of sand and the two dry mixed. Water is added slowly with a sprinkler and the plastic consistency tested by forming a ball with the hand, which should exude a slight moisture, and being laid aside should neither flatten nor crack open. A mortar of 500 kilos (1,102 pounds) of lime to 1 cubic meter (1,308 cubic yards) of sand, mixed and beaten dry, has more resistance than an equal quantity of pure lime. A house-building mortar contains from 440 to 551 pounds of lime per cubic meter (1,308 cubic yards) of sand. This is sufficient also for small arches and viaducts. For tunnels, foundations and viaducts of considerable height the proportion of lime is increased by 110 pounds, while for important arches and dams subjected to pressure the amount of lime per unit of sand is from 661 to 771 pounds.

Stones or other cheap material are mixed with the mortar, thus constituting the beton.

DEPARTMENT OF STATE, WASHINGTON.

THE REORGANIZED AMERICAN CONSULAR SERVICE AS AN AID TO FOREIGN BUYERS.

Practical Methods Recently Adopted for Making Commercial Relations Between the United States and Foreign Countries Closer.

BY JOHN BALL OSBORNE,

Chief, Bureau of Trade Relations, Department of State.

WHILE the noteworthy improvement recently effected in the consular service of the United States by legislation and executive action is a matter of extreme gratification to the American business public, it is almost equally satisfactory to the many thousand foreigners who are engaged in trade with this country, especially to the buyers of American manufactures. Those who export to this country are required to have recourse to the services of the nearest American consul for the legalization of invoices of their shipments. Although involuntary clients of the consulates, they are concerned in every measure that will insure an honest and efficient service. Foreign importers, on the other hand, come voluntarily to the American consuls in quest of practical information and advice, knowing that the promotion of American trade abroad is a most important branch of the duties enjoined upon those officers by the United States Government. The recent reorganization of the consular service has, therefore, unusual significance for importers and handlers of American goods, for there is every reason why they should be benefited materially.

One writer on international law has taken the ground that a consul is an officer of two governments—the one who sends him and the one who receives him—by virtue of his *exequatur,* which is the formal permission to act granted to him by the receiving government. While this view of the effect of the *exequatur* is not accepted by authorities in general, the modern development of the commercial duties of the American consul has brought about conditions that make it at least plausible. The promotion of his country's foreign trade has come to be one of his principal functions, and in carrying out the standing instructions of his government he is required to make every reasonable and proper effort to facilitate commercial intercourse between his countrymen and the business men of his district. In fact, the American consul is the official middleman between the American exporter and the foreign buyer, and it follows that both have the right to resort to the consul for information and advice in relation to this mutual object. It would, therefore, be as serious a dereliction of duty on the part of the consul to deliberately ignore the reasonable requests of the foreign merchant who seeks information with a view to the purchase of American goods as it would be for him to ignore the trade correspondence of an American firm.

There was a time—not so many years ago—when some of our consular officers made a practice of evading as far as possible, on one excuse or another, applications for trade information concerning American goods when they came to them from foreign business firms resident in their respective districts. I knew one consul in Germany who considered it a smart trick to invariably refer such applicants to the Consul-General of Germany in the United States. At the present day, it is needless to say, no such obstructionist tactics in the path of American commercial progress would be tolerated by the Department of State. Consuls are expected to enlighten the people in their districts as fully as practicable in regard to the superiority of American products, where and how to obtain them, and in every legitimate way to encourage and facilitate the importation of such products into their districts.

The primary and paramount purpose of the recent reorganization measures has been to devise such a system as will produce men of that character, and to retain them when secured. The new mode of appointment furnishes a guarantee of the high standard of the personnel, while the revision of salaries and application of the principles of the merit system make it worth while for young men to enter the service at the lowest grades, in the hope of promotion from grade to grade to the highest places, and with the reasonable prospect of retention through changing administrations, provided they render faithful and efficient service.

The change in the method of appointment is radical and far-reaching in effect. From time immemorial, and until only a few months ago, political influence—and generally plenty of it—was essential to securing an appointment in the consular service, and no branch of the Government was more thoroughly changed in personnel on the occasion of each transfer of party power, with the inevitable result that the service itself was demoralized and our commercial relations seriously prejudiced.

Under the new system political indorsements and influence are not necessary, for all appointments are made only to the two lowest grades of the service, and only after a rigid examination to show the educational and practical qualifications of the candidates. It should not require any political influence for a young man to obtain, through one of the Senators from his State, the "designation" that will permit him to enter this stringent examination.

The Reorganization Act of April 5, 1906, reclassified and regraded the principal consular officers, so that there are now 57 consuls-general, classified in seven classes, with salaries ranging from $3,000 to $12,000 (London and Paris), and 253 consuls in nine classes, with salaries ranging from $2,000 to $8,000 (Liverpool). The act also made the notarial fees official and declared the revised salaries to be the sole compensation of office. The new salaries, which were fixed on the basis of official income from former salaries and unofficial fees combined, are reasonably adequate, thus removing a just cause of complaint against the old service.

Another excellent feature of the reorganization law is the provision for regular inspection of consulates by a corps of five inspectors, designated as consuls-general at large. Each consular office must be inspected at least once in every two years, and a report be made to the Secretary of State. Formerly the Department of State usually learned of irregularities on the part of a consul only when his conduct had become a matter of public scandal in the community of his official residence. Under the new law an inspector has plenary power to suspend a delinquent officer and to take charge of his consulate.

What the reorganization act of 1906 failed to do for the betterment of the service has been accomplished, thanks to the genius of Secretary Root, through an Executive Order issued by President Roosevelt on June 27, 1906. This admirable measure has virtually put the consular service in the classified Civil Service of the United States, and given to the officers affected the same security of tenure as is enjoyed by clerks and division chiefs in the executive departments at Washington. Its provisions may be briefly summarized as follows:

Vacancies in the office of consul-general and in the office of consul above Class 8 shall be filled by promotion from the lower grades of the consular service, based upon ability and efficiency as shown in the service.

Vacancies in the office of Class 8 ($2,500) and of consul of Class 9 ($2,000) shall be filled: (a) By promotion on the basis of ability and efficiency as shown in the service, of consular clerks, and of vice-consuls, deputy consuls and consular agents who shall have been appointed to such offices upon examination. (b) By new appointments of candidates who have passed a satisfactory examination for appointment as consul.

A Board of Examiners for admission to the consular service was established, composed of two representatives of the Department of State and the Chief Examiner of the Civil Service Commission. The examinations are partly oral and partly written. The oral examination, which is conducted by the board, is intended to determine the candidate's business ability, alertness, general contemporary information and natural fitness for the service, including moral, mental and physical qualifications, character, address and general education and good command of English. The written examination includes at least one modern language other than English; the natural, industrial and commercial resources and the commerce of the United States, especially with reference to possibilities of increasing and extending the foreign trade of the United States; political economy; the elements of international, commercial and maritime law; American history, government and institutions; political and commercial geography; arithmetic, as used in commercial statistics, tariff calculations, exchange, accounts, etc.; and the modern history, since 1850, of Europe, Latin America and the Far East, with particular attention to political, commercial and economic tendencies. In order to be admitted to these examinations candidates must be between the ages of twenty-one and fifty years, citizens of the United States, of good character and habits, and physically and mentally qualified for the proper performance of consular work, and must also have been specially designated by the President for appointment to the consular service subject to examination.

The required passing mark is 80 on a scale of 100. Upon the conclusion of the examinations the Board certifies the names of the candidates who have attained that general average. These names constitute the eligible list from which all appointments to vacancies arising in the eight or ninth class of consuls will henceforth be made by the President. It is also provided that in designations for appointment subject to examination and in appointments after examination due regard will be had to the rule that, as between candidates of equal merit, appointments should be so made as to secure proportional representation of all the States and Territories in the consular service; and neither in the designation for examination nor certification of appointment will the political affiliations of the candidate be considered.

Equally important with the stringent examination system above described are the regulations governing promotions in the service. On this point the Executive Order provides that no promotion shall be made except for efficiency, as shown by the work that the officer has accomplished, the ability, promptness and diligence displayed by him in the performance of all his official duties, his conduct, and his fitness for the consular service. A permanent efficiency record of consular officers of all grades was established in the Department of State by Secretary Root soon after he came into office. Every consular officer was notified that the ability, promptness and diligence displayed by him in the performance of all his official duties, his conduct while in office, and the character of his reports upon the trade relations with the United States, would be considered as proper elements in the determination of his relative efficiency, and that this record would be consulted by the Secretary of State and be brought by him to the attention of the President in determining questions as to retention in office, transfers and promotions.

All these innovations for the improvement of the consular service furnish the best possible guarantee that worthy and efficient consuls will hereafter be retained regardless of political changes in the Administration, for public sentiment has become crystallized in favor of the new system and would not tolerate its abandonment by any party. In fact, Democratic as well as Republican leaders in Congress have expressed their unqualified approval of the changes, and Senators of the opposition who represent States whose quotas in the service have not been exceeded have not been slow to designate constituents for the recent examinations. Under these gratifying conditions there is no longer any justification for deploring the fact that the consular service offers no career. For the right sort of men a promising, even brilliant, career is now available.

From a stereograph copyrighted 1907 by Underwood & Underwood.
HON. PIERRE DE MERES.
Consul, Barranquilla, Colombia.

No argument is needed to show how foreign buyers of American goods will profit by the reorganization of our consular service. In time the new system will produce a corps of trained specialists, who will retain their positions so long as they render faithful and efficient service. I shall point out a few particulars in which the interests of foreign business men may be well served by the American consuls.

Trade Reports.

It is obvious that persons in foreign countries who are engaged in trade with the United States are vitally interested in the character of the commercial information furnished for official publication by the American consuls. Experience has shown that these reports are a very influential factor in the development of our foreign commerce. It is of the highest importance that they shall be as complete and accurate as is practicable. Formerly there were too many officers in the service who regarded this work as an irksome task, to be avoided as much as possible. These men made no reports upon their own initiative, and when they complied at all with specific instructions from the Department their reports were apt to be superficial and misleading. There is, however, no longer any room in the service for this narrow spirit of indifference. Every consul is required to make: (a) An annual report on the commerce and industries of his district; (b) a report, as complete as possible, in response to every circular or individual instruction from the Department; (c) and reports upon his own initiative on any phase of local commercial or industrial affairs in regard to which he can secure information that is likely to be of practical value to the American business public.

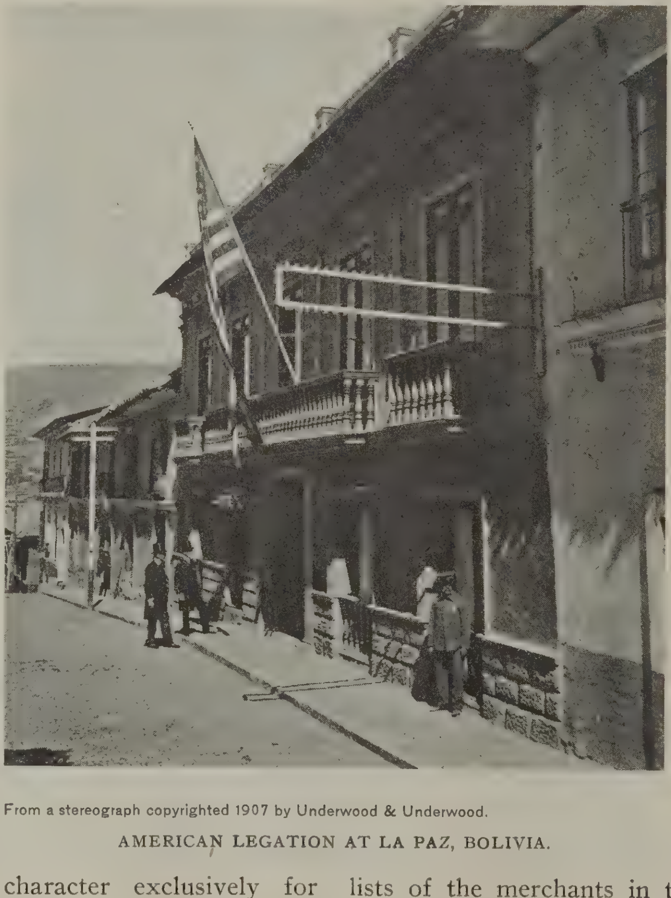
Many consuls now in the service make a close and intelligent study of local trade conditions and communicate to this Government every piece of intelligence that promises to aid in the practical enlightenment of American exporters. While I was in the service a score of years ago the consul who made a dozen trade reports a year exceeded the average record. At the present time it is not uncommon for a single officer to furnish 50, 75, or 100 trade reports per annum. One assured result of the recent changes in our system will be an improvement in the character of the trade reports.

Commercial Letters.

In the last two or three years the Department of State has frequently enjoined upon the consular officers the importance of aiding American manufacturers and exporters through the medium of trade correspondence. Thousands of American business men, when they desire any specific information about trade matters in a foreign country, write directly to the American consul. Many consulates are fairly deluged with these letters of inquiry, and, so long as the requests are reasonable, the consuls are expected to comply with them by sending replies through the Department of State for its information. Whenever these replies, as is often the case, contain trade information that would seem to be of interest and value to the business public two extra copies must be transmitted by the consuls, one for filing in the Department of State and the other for the information of the Department of Commerce and Labor.

"FOREIGN TRADE OPPORTUNITIES."

Another way in which the American consuls can be of great service directly to the foreign buyers of our products is through the medium of the occasional department of the *Daily Consular and Trade Reports* styled "Foreign Opportunities." Whenever, for instance, a foreign merchant desires to obtain detailed information concerning a particular American product that is not advertised in the pages of the AMERICAN EXPORTER, he has only to make his wishes known to the American consul in his community. It is the duty of that officer then to communicate the request to the Department of State, by which it will be referred to the Department of Commerce and Labor for publication in the *Daily Consular and Trade Reports* under the head above mentioned. In the publication, however, the identity of the foreign inquirer, or even the city in which he lives, is not disclosed, it being the policy to reserve information of this character exclusively for American export interests. American manufacturers who see the notice and desire to correspond with the possible foreign buyer are given his name and address on application to the Bureau of Manufactures, Department of Commerce and Labor, reference being made to the serial number of the "Foreign Trade Opportunities." The following examples of this commercial intelligence service are taken from late issues of *Daily Consular and Trade Reports:*


From a stereograph copyrighted 1907 by Underwood & Underwood.
AMERICAN LEGATION AT LA PAZ, BOLIVIA.

No. 1221. Street Sign Plates and Enamel Letters.—An American consular officer in Canada reports that a business man in his consular district desires to obtain the names and addresses of manufacturers of street sign plates and enamel numbers and letters.

No. 1224. Automobiles.—An American consular officer in southern Europe reports that a company has been formed in his consular district for the sale of automobiles. Up to the present time there have been no automobile dealers in the country in question, sales to date having been effected by foreign houses.

No. 1225. Paper Bag Machinery.—An American consular officer in southern Europe reports that a dealer in olives and figs desires illustrated catalogues, terms and prices of paper bag machinery.

No. 1226. Roller Skates.—Information has been received from an American consular officer in a Spanish-American country to the effect that roller skating has become very popular in his district. Exporters of skates, such as are fastened to the feet with straps and not clamps, will find a ready market for their goods. A large shipment just received had sold out quickly and there was a public demand for more.

No. 1234. Electric Power Plant Equipment.—An American consul in Central America states that a mining company is planning to erect an electric power plant at a waterfall near its mine, and will probably be in the market for a complete outfit in connection therewith.

No. 1235. Motor Boats.—An American consul in Canada names three prospective buyers for motor boats. He adds that the navigable conditions for this class of water craft in that district are excellent.

LISTS OF FOREIGN FIRMS HANDLING AMERICAN GOODS.

The Department of State, at the instance of the Department of Commerce and Labor, has recently instructed the American consular officers to furnish systematized lists of the merchants in their respective districts who handle, or might be induced to handle, American goods. This information is carefully indexed and filed for reference in the Bureau of Manufactures, Department of Commerce and Labor, and will, when complete, constitute a business directory covering the world and every line of industry that will be of immense value to American exporters. It is obvious that the co-operation of foreign buyers of American goods is desirable in this work. Every change in a firm name or address should be promptly communicated to the American consul for correction of the official list.

CATALOGUES AND SAMPLES OF AMERICAN GOODS.

Still another means of utilizing the American consular service is open freely to foreign buyers. They are invited and urged to visit the consulates and inspect the catalogues and samples of American goods which are kept on file at every well regulated office. American trade journals are also usually kept on file for the use of those interested. In a recent report, Consul Van Dyne, of Kingston, Jamaica, writes as follows:

> "I am interested in fitting up one room in the new consular offices as a cataolgue and consulting room for local merchants and buyers, and propose to have catalogues of American advertisers as well as trade journals systematically arranged and an invitation extended to the business men to come and consult them freely. Catalogues of American houses should be sent to this office. Quite a number have been sent already, but there should be many more. I would like to develop this branch of the work."

Efforts of this kind for the development of closer commercial intercourse are heartily encouraged by the Department of State and the Department of Commerce and Labor.

One of the best equipped offices in the service for the dissemination of practical information about American manufactures, with a view to saving the trouble of lengthy correspondence between American manufacturers and the foreign consumers, is the consulate at Prague, Bohemia. The following account of Consul Ledoux's bureau of information for the benefit of foreign buyers is reproduced from the *Daily Consular and Trade Reports:*

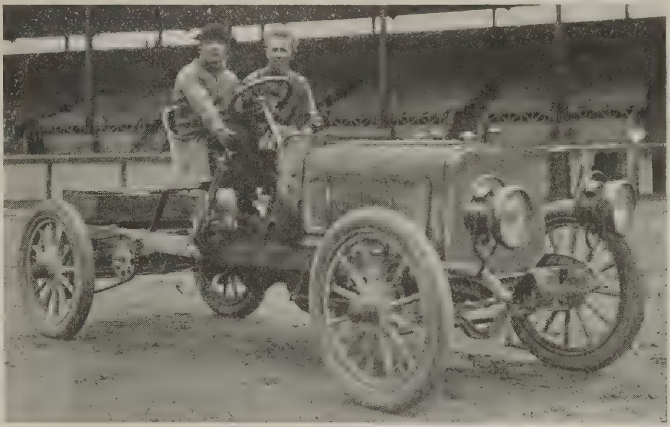
> "For a year previous to February, 1905, Mr. Ledoux worked on this plan, indexing, classifying, filing and collecting. On February 15, 1905, he gave a reception to all the other consuls and the officials of the city, and formally announced that his American commercial intelligence department was open to the people of Prague. Since then the business men of the town have constantly patronized it, and American trade has tripled.
>
> "Information about every American product that could possibly be needed in Prague is on Mr. Ledoux's files. He has everything properly classified and can give the fullest details at a moment's notice.

AMERICAN PAPERS ON FILE.

> "Another feature is the commercial reading room at the consulate. In this room 100 of the leading commercial and trade papers of the United States are on file and accessible. This room has become so popular in Prague that it is always crowded."

TWENTY-FOUR HOUR AUTOMOBILE RACE.

Fifteen competing cars lined up for the twenty-four hour International Endurance Derby, recently held at the Brighton Beach race track, New York. The event was open to single stock touring cars and touring runabouts, either stripped or fully equipped, of sixty horse power or under.



SIXTY H. P. LOZIER, WINNER OF 100 MILE RACE.

The starters were as follows:

Car.	Horse Power.	Driver.
Studebaker	35	M. Roberts, B. McIllried.
Thomas	60	Holm, Dittsman.
Lozier	40	Smelzer, Lynch.
Lozier	50	Michenor, Mulford.
Mitchell	40	Zirber, Hudson.
Frayer-Miller	50	Lawwell, Knepper.
Jackson	40	Burman, Cobe.
Welch	50	Trewen, Greenwood.
Delehaye	45	Mongini, Santi.
Pilain	28-32	Strang, Anderson.
Darracq	50	Nunegray, McMullen.
De Dietrich	50	Fuller.
Oldsmobile	35	Steurwald, Anderson.
Stoddard-Dayton	35	Howard, Thomason.
Matheson	30	Ryall, Reifenburg.

The score at the end of the race was: Thomas, 997 miles; Lozier, 972 miles; Jackson, 966 miles; Darracq, 720 miles.

The one hundred mile race, open to stock touring cars and runabouts, 60 horse power and under, was handily won by Lozier, 60 horse power, driven by Michener, with Packard second and Studebaker third.

TWENTY-FOUR HOUR RACE, BRIGHTON BEACH TRACK.
Thomas, first; Lozier, second; Jackson, third.

THE AMERICAN IDEA IN LONDON.

What It Has Done in England's Capital—The British Loath to Acknowledge the Source of Benefits.

BY B. OLNEY HOUGH,

EDITOR, THE AMERICAN EXPORTER.

LONDON, August 1, 1907.

THOROUGHLY characteristic of present-day British temper is the caption that the *Pall Mall Gazette* put a few days ago to a New York cablegram announcing the shipment of a cargo of American steel rails to Dalny, *"Britain Advances the Money—America Supplies the Goods."*

There now exists in England a popular recrudescence of insularity that may be patriotism or may be politics. Far be it from the stranger to judge. The notable fact is that from every other show window stares out the legend, "Made in Great Britain," "Our Goods Are All British Made," or other intimation to the same effect. The legend does not always tell the truth, and alongside of it subsists, yes, flourishes, an American shop.

That the cry of Mr. Chamberlain and his followers has convincingly penetrated many British hearts is, however, evidenced by the fact that—or so I am told—an increasingly large percentage of foreign goods is now being imported unmarked with name of manufacturer or place of origin. The inference is obvious. Telling, too, is the other admitted fact that partially prepared material is constantly growing in importation to be finished in British workshops, and that there is an unprecedented demand on the part of British manufacturers to purchase American or other foreign patent rights, or the privilege to manufacture under them on royalty.

To my mind this is the most significant feature distinguishing the British commercial world of to-day, and it is full of meaning, which the world will do well to appreciate. In the course of a month's visit to the principal cities of Great Britain I do not think that in one instance, where I have talked politics with a British business man, the opinion has not been expressed that in a comparatively short time—say, within five years—the United Kingdom will surely have adopted Mr. Chamberlain's tariff proposals, and, coupled with enthusiastic devotion to the principle, is a pronounced tendency to gloat—no other word will express it—to gloat over the brilliant future that Britain's manufacturers will then enjoy when American electrical devices, American machinery, American hardware, American boots and shoes, American whatnot will be barred by a tariff wall and no longer be able to compete with the long-suffering British manufacturer. How far this would work out in exactly the way expected may be open to pertinent question, but certain it is that this is the temper to-day of the British manufacturer, and just as certain it is that he is now engaged in making his plans to manufacture here as large a part as possible of the goods he has heretofore obtained more cheaply from the United States.

It should by no means be forgotten, however, that certain American goods the British manufacturer can never supplant, nor that far more strenuous tariff provisions in Germany, for example, than are possible here have not prevented a wholesome growth of American business in that country, and, moreover, along many of the same lines that have hitherto been successful in free-trade England.

Evidences of an American invasion are met with at every turn in the form of innovations undreamt of by the Londoner twenty years ago. It may perhaps be doubtful whether the average British citizen appreciates the fact that these innovations are of American origin. He is disposed to argue that if a thing is good it is British. Your waiter, as he serves your dinner in the restaurant, volunteers the information that the piece the orchestra is playing is from a certain operetta "that all London has gone mad over just now, sir." You remark that it is German music, popular in Berlin two years ago. The waiter moves away with a certain sad incredulity. He feels sure that any music that is worth anything has its first hearing in London as a matter of course.

The adjective "American" is tacked on to many a novelty, primarily to advertise it as a novelty, and, probably, very often without any serious expectation that it will develop into a permanent fixture in British life. I am told by a man in a position to know that there are now about a thousand American soda water fountains in London and its suburbs. The sign, "American Soda Fountain," greets you from many a tea-room, confectioner's shop and restaurant, sometimes in the most unexpected locations. But, like the "American bar," the institution has in British practice drifted far from its original American prototype.

Twenty years have passed since, as a boy, I made my first visit to England. In the course of these years I have revisited London many times, and always I have found new marks of the effect wrought on life here and on the physical aspect of the city itself by American example, and the introduction of American inventions and practices. When one traveled by rail in England twenty years ago he found none of the conveniences and luxuries which he had long since grown to regard as indispensable and as a matter of course at home. Here one found no lavatories in the railway carriages, no steam heat, no gas, to say nothing of electricity, no dining cars, no sleeping cars. This has all been changed now, very gradually, very slowly changed, although in the general use of the "corridor" train the railways of this country are still behind some of those on the Continent. Every one of the improvements toward comfort in railway travel owed its invention to America, and its introduction here to American example.

Twelve or thirteen years ago I occupied an office in one of London's chief business districts for many months during the year. Tiny rooms, dingy, dirty, up two or three flights of steep, narrow stairs, without heating apparatus beyond a provokingly inadequate grate, without sanitary facilities of any sort, boasting the sickly illumination of antique gas jets. Telephone? Who in London thought in those days of using a telephone? How many business houses used typewritten letters? Yet my offices were the best that I was able to find for my purpose. But to-day—ah! the American Idea has wrought its work or has at least made a beginning. In every direction, even in the old City, you find comparatively comfortable offices, elevators, steam or hot water heat, electric light, telephone, and quite as a matter of course you have your "shorthand writer and typist."

Within my own knowledge it has taken London twenty years to realize the advantages to be gained by adopting the improvements which a newer country had to offer. It is far from my purpose, as an American, to indicate any feeling of superiority in that the older country was "shown how" by my own. It must be remembered that the majority of these improvements were the result of necessity, and "necessity is the mother of invention." In grappling with the novel and gigantic problems which the unexampled industrial growth of a new country brought forward for solution, improvements resulted which were so important and so revolutionary that they could be utilized with equal benefit by the old countries as well as the new. Therefore the subject does not rightfully belong to the domains of sentiment and patriotism but to the industrial world as a whole, without regard to nationality.

Is the debt to America acknowledged? No—or but grudgingly and with reservations. I fancy that there's many an Englishman who disapproves of these innovations, just as there are many I know who climb the stairs by preference instead of patronizing the lift.

How slowly do things change here! And yet there still exist Americans who run over to London, confident of converting the Englishman to a new scheme in three days' time. For thirteen years, to my personal knowledge, there has been more or less talk in London of steel building construction after the "American Idea." It has arrived at last, but not until an American engineering firm personally introduced and demonstrated it to unconvinced London. I do not mean to criticise English deliberation. On the contrary, while I wonder at it, I yet approve of it in a way. I fancy that we should do many things much better and more wisely in America were we to temper impetuosity with a liberal allowance of something like this same British care and deliberation. Nevertheless, the American never ceases to be amazed by this ineradicable British characteristic, and not unusually entirely loses patience with it.

Said the secretary of a big combination of British cement manufacturers when talking to me about cement construction work in this kingdom: "Our people haven't waked up to it yet. Some of you Americans will have to come over here with their money and show our Englishmen how it's done and what its advantages are."

When in London a year ago I used to patronize the recently opened "Bakerloo" tube in order to visit certain friends. Quite by the bye, London owes her present system of "tubes" to American enterprise and initiative. And when anything goes wrong—but only then—you see the newspaper columns liberally sprinkled with the adjective "American." The Bakerloo tube was at that time almost deserted. There were seats galore to be had by every train. To-day the Londoner has at last become aware of its existence and the trains are crowded. The County Council has built and is operating electric tram services right across the city, and, incidentally again, provides a very good service at fares equivalent to 2 and 3 cents, according to distance. And, postscriptum number two, will it be denied that the present and the prospective electric tram development is also very largely due to the force of American example?

The casual visitor to London will probably be impressed by the thickly displayed signboards of the American shoe store, American iced drinks, the American soda fountain. But the American Idea in its influence upon London life goes far deeper than these comparatively trivial and surface indications. It is undeniably true that there exists in England a supercilious disdain of the Yankee—the pushing, boastful Yankee, his accent and his mannerisms. I do not think that we Americans can do better than accept it in good-natured indifference. After all, it is by no means worse than the attitude with which the Englishman greets his Australian cousins and protégés when they visit London. Nor is it much if any worse than the ridicule they privately heap upon the French "froggy" when it is not a question of a public discussion of the *entente cordiale*. But I do feel moved to plead for a little more general and more honest recognition of the material debt that London and the English nation owe to American inventive and creative genius, to American enterprise and initiative in this, John Bull's own island, a very few examples of which I have only been able to refer to here as what is coming to be known and approved of as the "American Idea."

In the fiscal year ended March 31, 1907, Canada's total foreign trade was $616,099,989, made up of $343,893,383 imports and $272,206,606 exports. This broke all records both in imports and exports. The 1907 total was $65,000,000 ahead of 1906; $146,000,000 ahead of 1905; $144,000,000 ahead of 1904, and $230,000,000 ahead of 1903. Canadian manufacturers are catering to export trade.

WITH THE MANUFACTURERS.

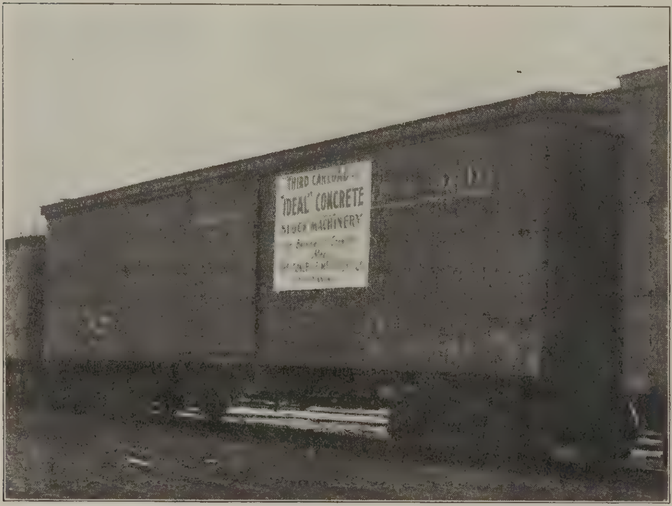
Industrial Notes of Interest—Descriptions of Products Which Find a Ready Market Abroad.

"IDEAL" MACHINES FOR MEXICO.

The success of the Ideal Concrete Block Machine, its universal adoption and the increasing demand from every country in the civilized world, is a modern proof of the ancient saw that "it never rains but it pours."

There has recently left the factory of the Ideal Concrete Machinery Company, of South Bend, Ind., the third carload of a four car shipment of Ideal concrete block machines to Mexico. The fourth carload is practically ready for shipment, and will go forward at an early date.

Heavy shipment of the Ideal machines to foreign countries is becoming so frequent as to be regarded as quite an ordinary occurrence. Shipments have recently been made to Valparaiso, Chili; Panama, Central America; Khartum, Sudan, Egypt; Glasgow, Scotland; Budapest, Hungary; Bucharest, Roumania, and elsewhere.



THE THIRD CARLOAD OF A FOUR CAR SHIPMENT OF IDEAL CONCRETE MACHINES FOR MEXICO.

The heavy export requirement for Ideal machines, coming as it does to swell the monthly multiplied domestic demand, has necessitated increased factory facilities that rank the Ideal Concrete Machinery Company among the leading manufacturing concerns of the Middle West.

Recent improvements to the Ideal machine make it universal in its adaptability, and really unique among machines for cement block manufacture. An attractive and expensive catalogue has recently been issued that is a valuable guide to the home builder and the block manufacturer alike. It is sent free on application, and the information it contains makes it well worth sending for.

SHEET METAL BUILDING MATERIALS.

The export demand for the sheet metal building materials manufactured by the Metallic Roofing Company, of Toronto, Canada, is growing to large proportions. Among the products are metal shingles, roofing, iron fencing, corrugated sheets, rock-faced corner stones, ornamental ridgings, sidings, cleats, oiled building papers, cornices and metal ceilings.

"THE BELT BOOK."

Charles A. Schieren & Co., the well-known manufacturers of leather belting, have just begun the publication of a monthly paper, "The Belt Book," attractively arranged, well illustrated and containing much interesting reading matter.

To quote from its introduction:

"'The Belt Book' has been started to help a little in the progress of the tanning and other leather industries. It will try to be up-to-date itself. Its editor will endeavor in every way to avoid getting any trace of tannin in his system. Briefly stated, its object is to circulate information in palatable form about the leather business, and especially about belts. New processes and their better results will be described. Users of belting will be told how to pick out good belts and belts to fit their particular needs. They will be given hints as to the proper use of belting, to get the best service and the most service out of it.

"Much quaint historical information will be furnished.

"A joke now and then may be——

"But introductory announcements are tiresome. Note this carefully—if you don't read 'The Belt Book' its editor will be grievously disappointed. You won't be disappointed, perhaps, because you won't know what you are missing. Warning is given in advance, however, that above everything else there is to be the effort to make 'The Belt Book' entertaining and worth reading."

SOFA BEDS FOR HOTEL.

The Statler Hotel Company, who are erecting the huge new hotel in Buffalo, have placed an order with the Jamestown Lounge Company for an even one hundred "Simplicity" Davenport sofa beds for the new hostelry. The style selected is a massive Colonial design in mahogany, one of the finest patterns in the line. This will be richly upholstered in high grade fabrics to harmonize with the handsome furnishings of the house, and as the order specifies "De Luxe upholstery," with the finest quality of curled hair filling, it is evident that the Statler Company feel that there is nothing too good for the patrons of the hotel.

As the "Simplicity" was chosen in competition with nearly all the best known makes of sofa beds in the market, the manufacturers are excusable for feeling somewhat elated at the receipt of this order. The hotel is expected to open for business early in the fall, and is supposed to be one of a chain of new hotels to be erected in other cities in the near future by the Statler Company.

NEW IDEAS IN REVOLVER CONSTRUCTION.

The Harrington & Richardson Arms Company, of Worcester, Mass., have recently placed on the market a new revolver, known as Model 1906, which is described as a "marvel for the price." This is a 22 caliber, 7 shot revolver of the rim fire style, and is adapted to the following rim fire cartridges: 22 short, 22 long and 22 S. & W. long. The weapon weighs 10 ounces and is supplied with 2½, 4½ or 6 inch octagon barrels.

CEMENT MACHINES IN IRELAND.

That the concrete block is destined to play an important part in heavy construction in all parts of the world is evidenced by a large order just received by the Century Cement Machine Company for a number of their Hercules machines to be shipped to Ireland, where they will be used in turning out stone 12 inches high by 24 inches long, to be used in the construction of a Roman Catholic church, to cost over $60,000.

This immense edifice will be built entirely of concrete block, and when completed will be the largest concrete block structure ever erected in Ireland.

Fine examples of Hercules concrete block construction can be seen in various parts of Ireland. On Chichester street, Belfast, stands a handsome four-story concrete block office building, erected last season by one of the best known firms in Belfast.

A new line of railroad now under course of construction will have concrete block stations, several Hercules machines having already been received by the contractors having the work in hand.

PRESIDENT ROOSEVELT IN A REO.

The accompanying illustration shows President Theodore Roosevelt, Secretary Loeb, President J. L. Snyder, of the Michigan Agricultural College, and President R. E. Olds, of the Reo Motor Car Company, on their way to the Michigan Agricultural State College, at Lansing, on the occasion of the recent semi-centennial celebration there.

Lansing is the home of the "Reo," and the big plant where the well-known cars of the Reo Motor Car Company are made is one of the largest and most important manufacturing establishments in Michigan. The Reo Company reports a very large foreign business on their cars, and are booking more orders than ever before.

MINIATURE AIR DRILL.

Compressed air and pneumatic tools are so generally used in machine shops throughout the world that our readers will be interested in a unique and novel tool recently put upon the market by the Chicago Pneumatic Tool Company, Chicago, Ill.

This tool is known as the "Midget Air Drill." It is claimed that this remarkable drill has a capacity for drilling up to and including three-sixteenth inch of steel, and its weight is only 2½ pounds. The distance from the top of the breastplate to the end of the spindle is 7⅝ inches. The speed of the motor is 22,000 revolutions per minute, and the speed of the spindle 2,000 revolutions.

The drill is of the rotary type and operates at full speed without vibration. It is particularly adapted to drilling tell-tale holes in staybolts or general light work where great accuracy is required.

NEW MODEL OF STEAM RUNABOUT.

The White Company, of Cleveland, Ohio, announces that it has now commenced deliveries of its Model "G" 30 horse power steam runabout which was seen for the first time at the Grand Central Palace Show. The chassis of this car is identical with the other Model "G" White cars, except that its wheel base is but 104 inches as compared with 115 inches in the other machines of this model, and also it is geared for somewhat higher speeds.

A distinctive feature of the body work of this car, as compared with other high-powered runabouts, is the arrangement of a combination sliding and folding door at either side of the rumble seat, which adds much to the general businesslike appearance of the machine. Another distinctive feature is that back of the rumble seat of a good sized space is provided especially to accommodate baggage, and a small dust-proof trunk is provided which exactly fits this space.

In all of the company's 1907 models of steam cars the fundamental features which characterized the previous model of White cars have been retained, but there have been numerous noteworthy improvements along the lines of progress. The system of regulation has been so perfected that there is always a practically constant steam pressure whether the car is traveling fast or slow, coasting, climbing the steepest hill, or pulling through sand or mud.

IMPORTANT PAINT INTERESTS.

The firm of Brandram-Henderson, Limited, has been incorporated in Canada with a capital of $1,750,000 to take over the paint, varnish and color business of Henderson & Potts, Limited, Halifax and St. John, and Henderson & Potts Company, Limited, Montreal, and in addition to corrode and manufacture Brandram's B. B. white lead in Canada by the same special process employed by Brandram Brothers & Co., Limited, London, England, for upward of two centuries. The manufacture of other lead products will also be undertaken at the same time.

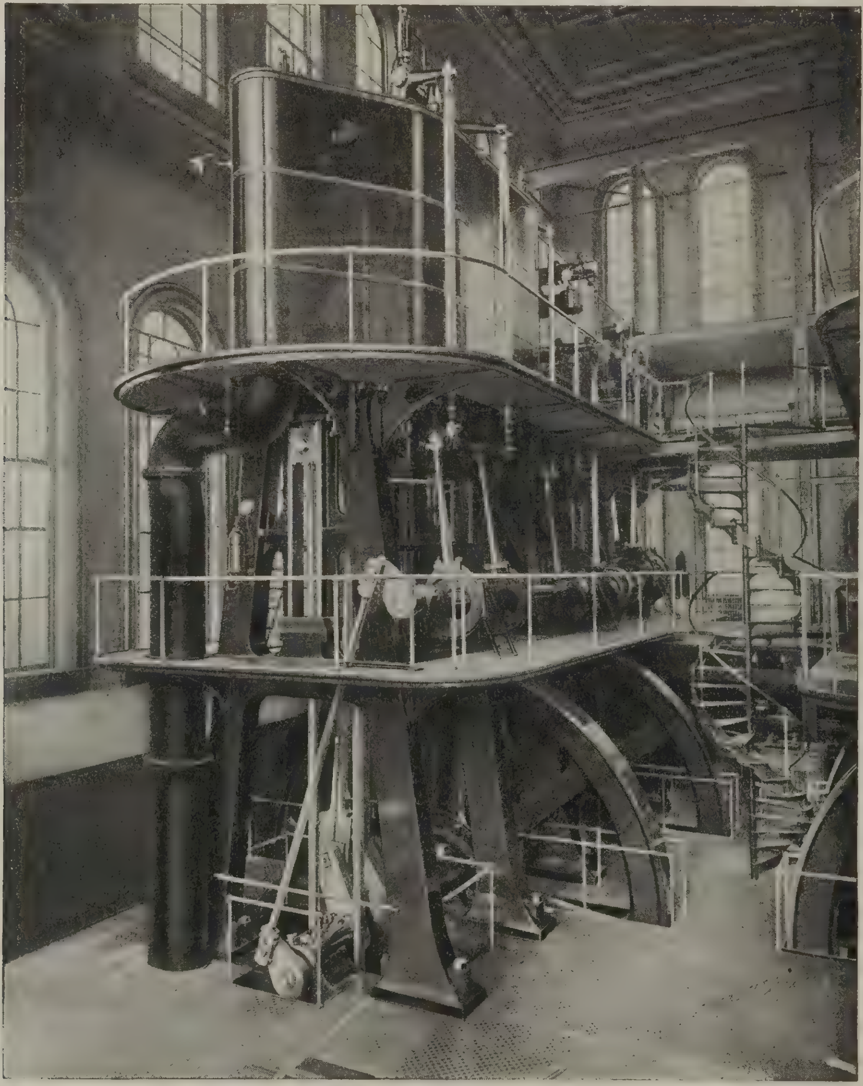
It is hardly necessary to call the attention of the public to the merits of Brandram's B. B. white lead, because it has been the standard for so long. During the time in which the firm of Henderson & Potts have been sole agents and grinders of this lead in Canada the demand has steadily increased, and it was found necessary to equip a factory with a capacity of 3,000 tons per annum, provision also being made to double this output when required. These lead corroding and other works, comprising an area of over five acres, are being erected in Montreal, Canada, and are nearly completed. When these works are in operation Messrs. Brandram-Henderson, Limited, will be the only firm in Canada who corrode and manufacture their own dry white lead.

ALLIS-CHALMERS ENGINES IN THE PUMPING PLANT OF THE OMAHA WATER COMPANY.

By Willis Collins.

From the standpoint of high economy continuously maintained throughout a long period of time, the central station of the Omaha waterworks system, equipped with Allis-Chalmers pumping engines, has a record of more than ordinary interest, as will be seen from the following account.

The construction of this system was begun in 1880, when the population of the city was only 30,000, and completed in 1883. When completed the system had 28 miles of water mains and 250 fire hydrants. The Missouri River was the source of supply. The water was first pumped up about 30 feet to four large basins on the river side, where sedimentation took place, considerably clarifying the water. The clarified water flowed to the suction of the high lift pumps, which discharged to a 10,000,000 gallon reservoir on Walnut Hill. Water was supplied to the city of Omaha, South Omaha and the suburbs of Dundee, Florence and East Omaha. In 1886 the average daily consumption was about 6,000,000 gallons.



PUMPING ENGINES.

In 1887 a new central pumping station was built at Florence, Neb., which is located several miles up stream on the Missouri River beyond all danger of sewage contamination to the water. The plant is surrounded by 107 acres of parked ground, and is called by the Indian name of pure water, viz., Minelusa. The mechanical equipment of this plant is particularly fine. Although some of the machinery has been in operation for nearly twenty years, the record for economy and reliability is most creditable and comparable with pumping plants built ten or fifteen years later. The low service and high service pumps are installed in the same station, and supplied with steam from a common boiler plant. The first installation consisted of two 12,000,000 gallon vertical compound, crank-and-flywheel pumping engines of the Allis-Chalmers type to work under a head of 70 feet for the low service, and one 18,000,000 gallon vertical, triple-expansion pumping engine of the Allis-Chalmers type, to work under a head of 310 feet for high service, discharging to reservoir and distribution system. The low service pumps deliver the water to a series of sedimentation basins on the bank above the river, these basins being arranged with a series of cascades between adjacent basins, with water levels carried so as to give a drop of 2 feet or 3 feet over each series of cascades. The cascades have sills perfectly level and long enough to carry the maximum amount of water in a very thin sheet. Air is admitted freely behind the falling water. This complete aeration of the water, alternated with complete rest in the sedimentation basins, has a wonderful clarifying effect, and practically removes all of the red silt from the river water by the time it reaches the last basin. The clear water flows to the high lift pumps under a slight head.

In 1898 the increase in water consumption demanded additional pumping capacity, and an 18,000,000 gallon Allis-Chalmers vertical compound pumping engine was installed for low service duty, and a little later, in 1902, a 20,000,000 gallon vertical triple Allis-Chalmers pumping engine was installed to give increased capacity for the high service system, making in all five Allis-Chalmers pumping engines with an aggregate capacity of 80,000,000 gallons per twenty-four hours.

All of these pumping engines have records for reliability; there has never been a break requiring a shutdown for repairs.

The first vertical, triple-expansion pumping engine has the following cylinder diameters: h. p., 40 inches; i. p., 70 inches; l. p., 104 inches, and the stroke of all is 60 inches. These cylinder sizes were very much larger than anything ever designed for pumping engine work at that time. The total weight of the machine was about 1,500,000 pounds. The introduction of this unit reduced the consumption of fuel 50 per cent., and for some years was claimed to be the most economical pumping engine unit in service, requiring but 1½ pounds of coal per horse power per hour.

The second vertical, triple-expansion pumping engine has steam cylinders of the same diameters as corresponding cylinders on the first engine, but the stroke is increased to 66 inches. Each pumping engine makes twenty revolutions per minute, and the second machine has 10 per cent. greater capacity on account of the longer stroke. The second machine is of the "self-contained" type, with the steam engine supported by the pump chambers.

There are now 230 miles of water mains, and about 15,000 service connections to the Omaha water system.

AN INNOVATION—THE "GO-BASKET."

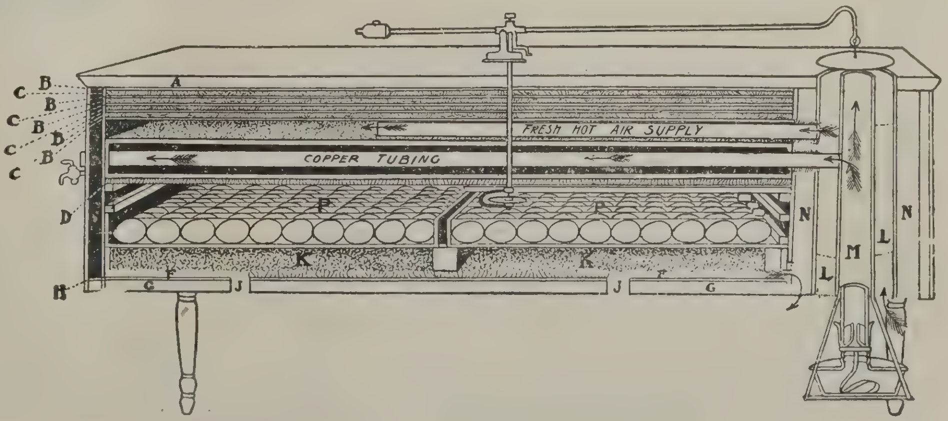
The "Oriole Go-Basket," two views of which are presented herewith, is a distinctly novel invention that has already proven one of the fastest selling specialties that has in recent years been put upon the market. The "Go-Basket" is a combination of a baby's go-cart, chair, jumper or bassinet, and can be picked up by the mother, always with the baby in it, almost or quite as easily and handily as an ordinary traveling bag. Three seconds suffice to make the change from a go-cart, the wheels disappearing from sight, and permitting baby, "go-basket" and all to be taken on the lap or on the arm without danger of soiling the clothes. Its convenience, therefore, in crowded streets, in shops, on tramcars and in many other situations where it is usually impossible to take a go-cart commends the "go-basket" on sight. The Withrow Manufacturing Company, of Cincinnati, Ohio, who are the inventors and manufacturers, further point out the fact that, besides being of strikingly handsome design, the "go-basket" is fitted with a sunshade, amply protecting the eyes of the child.

A SILVER JUBILEE.

Incubators and brooders are by no means new apparatus in America, and the products of our factories, shipped to many foreign markets for many years past, have made this phase of American ingenuity familiar and popular in most countries where any interest exists in raising poultry. One of the oldest manufacturing concerns in this line, the Reliable Incubator and Brooder Company, Quincy, Ill., is this year celebrating its silver jubilee, for it dates its organization from exactly a quarter of a century ago.

The illustration here shown represents what the company in question claim is a line of apparatus quite unique in its class, for although shown at all of the principal expositions and trials in competition with other makes, they have never once been beaten in all these twenty-five years.

It may be observed that several facts have probably contributed to the pronounced success of the "Reliable" line; first, the machines are entirely constructed under one roof; second, from the selection of the material up to the final operation of packing for shipment they are subject to the personal supervision of foremen who have grown up with the business. The extent of the export demand for "Reliable" incubators and brooders may be judged from the fact that unusually elaborate and instructive catalogues are published in Spanish and German as well as in English.



SECTIONAL VIEW OF THE RELIABLE INCUBATOR.

NEW TYPEWRITER.

It is the universal opinion of the leading commercial houses that a typewriter is an absolute necessity in their business, and while $100 seems to be a large sum to pay for an instrument to take the place of the pen, they have always been compelled to pay this high price. It has been demonstrated beyond question that a thoroughly reliable high speed simple typewriter can be produced at one-half this price, for the American $50 typewriter, with its simple lever type bar, is now found in the leading commercial houses throughout the world. During the past seven years it has earned a reputation for simplicity, durability and high speed unsurpassed by any.

MODEL 8 AMERICAN.

As improvement is the order of the age, however, the manufacturers announce that their new Model No. 8, improved in many important details, is now ready for the market.

First and foremost is the improved type bar bearing, the most important part of all typewriters, which insures the type bars lasting a lifetime. While this adds considerably to the cost of the machine, nevertheless it is warranted by the strengthening of the type bars, which gives even a more permanent alignment, greater strength and rigidity.

Other improvements are a pointer or indicator showing the exact printing point without the necessity of referring to the scales, which makes the machine ideal for tabulating and similar work; a two color ribbon shift, which by pushing a lever enables the operator to emphasize any word or sentence by printing it in red; also in statements the credits in red and the debits in black. In addition to these improvements a number of minor changes have been made in the ribbon feed, the bell and carriage shift. Those who are familiar with the machine know that these improvements bring the American up to date in every particular.

DIFFICULT PROBLEMS THAT CONFRONT A WAGON MAKER.

Factory-made wagons and carriages have virtually monopolized the world's markets of late years. In fact a large proportion of so-called wagon manufacturers of second and third rank do little more than assemble together wooden and iron parts manufactured for that purpose. There are, however, some varieties of wagons for whose construction something more is essential, if a permanent business is sought on the basis of a *clientèle* of satisfied customers. There are wagons which can only be substantially and durably built by mechanics possessed of intelligence and manual skill. In this class of vehicles none presents more serious problems to the builder than wagons for the transportation of ice.

The American ice wagon undoubtedly represents perfection, so far as yet attainable, in this line, for in no other country in the world is ice so freely and generally used as in the United States, and in no other country has one-quarter the thought been given to ways and means of gathering, storing and delivering ice. The American ice wagon is *sui generis* and deserves respect, even though so familiar a feature of village and city streets as almost to provoke the old proverb. Moreover, their use has rapidly been spreading throughout tropical countries, as their peculiar and perfect qualities for the end desired have become more widely appreciated. These observations are prompted by a recent visit to the establishment of Finnesey & Kobler, of Philadelphia, where ice wagons are one of the specialties on which the firm prides itself. In the course of an interesting discussion of the peculiar requirements of ice wagon construction several points were made clear, which should be brought emphatically to the attention of users of as well as dealers in this sort of vehicle, whether actual or prospective.

The life of an ice wagon depends, not on wear and tear, as is the case with most other vehicles, but on the decay of the timber and the rusting of the springs and other metal parts, occasioned by the dripping of the ice water. Two factors in the construction of such wagons must, therefore, receive extraordinary care—material and workmanship. The woodwork must not only be tough, but perfectly well seasoned. Kiln-dried lumber will not do; it must be thoroughly air-dried. Oak is used for the sills, for it has longer life than hickory, but for the standards hickory is better because tougher and stiffer. All iron work must be hand forged, tires of round-edge steel bolted on, axles of one-piece steel, loose collar with chilled boxes. The springs are one of the short lived features of an ice wagon on account of the constant dripping of ice water upon them, hence they must be slightly heavier than used in other similar wagons, oil tempered and steel ribbed. Finally, good and thoroughly reliable custom work only should be employed from the boring (not burning) of bolt holes to the forging of the irons. In no other way can a satisfactory wagon be produced.

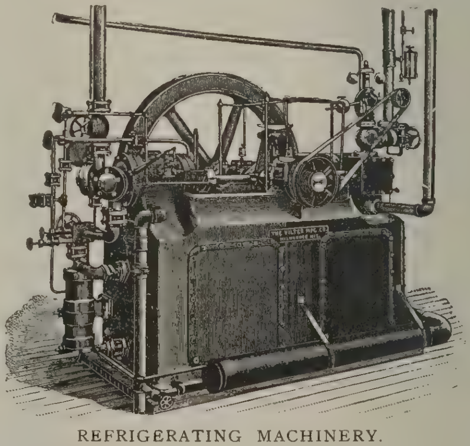
WESTINGHOUSE MOTORS.

The introduction of the electric motor into modern methods of manufacturing has practically revolutionized many of our industries. The variety of uses to which the motor has already been put is one of the wonderful features of the present day's industrial operations, and yet its development appears to have only just begun. The absence of steam, dirt and smoke, the extensive elimination of the dangerous belt, as well as the greater economy of electric power over steam, are some of the causes which are making the ascendency of the "electric drive" so phenomenally rapid. So important has this work become that the largest electric companies have a special department which takes care of the work of electric motor power production. Taking, for example, at random some of the orders which the Westinghouse people have taken in this field since the 1st of June the variety of the use of the motor becomes evident. The East Pittsburg works are now turning out sixteen locomotives for coal mines in West Virginia and Kentucky, one for an iron mine in Sweden, another for a power company in the State of Washington, and one for a plate glass mill at Charleroi, Pa. They are constructing a complete electric motor equipment for a phosphate mine in Florida, for a lumber camp at Mount Pleasant, Pa.; they have in hand an order for thirty-nine motors to drive machinery in a cash register manufacturing plant at Dayton, Ohio; they are turning out fifty-nine motors for driving textile looms at East Hampton, Mass., and a larger number for running spindles in a worsted mill at Passaic, N. J. Fifteen motors are going to a paper mill in Canton, N. C., and twenty to a paper mill in Fulton, N. Y.

Since the electric motor has become a fixture in the Southern cotton mills that industry has reached a state of prosperity never known before, and since the electric power motor has been brought into the metal mining industry many of the copper, gold and silver mines in Mexico, Arizona, Colorado, California and other Western mining regions have again begun operations after they had been abandoned because power to run them was too expensive to obtain.

THE VILTER MANUFACTURING COMPANY.

The Vilter Manufacturing Company, with offices at 848 Clinton street, Milwaukee, Wis., has been long known as one of the foremost concerns in its line of business in the United States. The business was established in 1867, and from a small beginning has grown to a concern of large proportions. The plant occupies a ground space of 5½ acres; the plant is equipped with all modern tools and appliances, including electric cranes for handling all classes of work in the most convenient manner. The buildings are comparatively new, and for the most part are fireproof. Aside from the main machine shops, which are 85 feet by 417 feet, is the foundry, 85 feet by 250 feet, also equipped in the latest approved manner; a power house with pattern storage overhead, the entire building being fireproof, four stories high and 120 by 100 feet in dimensions. Then a brick storage house for storing all clasess of material 50 by 120, a blacksmith shop 60 by 150, and at present the concern is building a new steel and brick fireproof mill construction building 60 by 177 feet, four stories high, to house the pipe working plant.

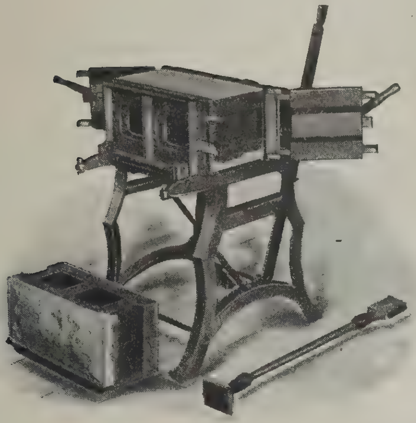


REFRIGERATING MACHINERY.

The Vilter Manufacturing Company has operated its extensive works day and night for over twelve years, and its main product is ice making and refrigerating machinery, which is shipped to all parts of the world. The concern also builds a full line of Corliss steam engines for general power purposes, as also for elecrtic light plants, etc. Aside from the above the concern manufactures also brewers' machinery and bottling outfits.

Catalogues on any of these products are gladly mailed to parties who contemplate the purchase of machinery in any of these lines.

CEMENT MACHINES.



The Cement Machinery Company, of Jackson, Mich., manufacturer of concrete block, brick, post and mixing machinery, has placed upon the market several new machines. This company prides itself on being up-to-date and keeping in touch with the wants of the various contractors and cement workers all over the United States and foreign countries.

Heretofore many have preferred an exclusive Face Down Machine; others an exclusive Side Face Machine, but this company finds there is a large demand for a combination of both these styles of machines. In other words, the two machines in one; and at the present time it is receiving many orders for its new machine, which will be called the "New York Combination Face Down and Face Side Concrete Block Machine." It is a medium priced machine, adjustable to widths of 8 inches, 10 inches and 12 inches, 16 inches in length and 8 inches in height, and is equipped with the very latest of designs for the widest range of work.

The advantage that this machine will have, it is said, over face down machines is the fact that instead of pulling the cores horizontally and taking a chance of the material falling in while the cores are being withdrawn, as is the case on some face down machines, the cores on the New York Combination are not drawn until the mold is in a vertical position, and by simply changing one door this New York machine can be left in a vertical position and turned into an exclusive side face machine.

Another great advantage is that one width of bottom plates will do for all of the different widths of blocks, either side face or face down. This is a great saving in the matter of pallets, as one width of pallet does for everything. It is a machine that will weigh, complete, about 700 pounds, and is built very durably, and will certainly meet with approval, as the trade demands a machine of this kind.

This company has also perfected what it calls an "adjustable column mold," and it is now able to furnish it. This mold is for making square columns, hollow or solid, 8x8 inches, 10x10 inches, 12x12 inches, 14x14 inches or 16x16 inches, and is 9 inches high. It is built on the lines of their practical adjustable sill, cap and step mold, which is adjustable to any length between 12 inches and 72 inches, and any width from 5 inches to 14 inches. This sill, cap and step mold is being sold as fast as the company can make them, and those who have not seen a booklet on this mold should secure one at once, as it is said to be the most practical device on the market for the manufacture of solid concrete products.

The Cement Machinery Company has also placed upon the market its "adjustable sidewalk mold," which will make sidewalk blocks 4 inches high and in any dimension from 24x32 inches down to a minimum dimension of 12x12 inches, which "adjustable molds" are absolutely adjustable; that is, they require no wood to be placed in them for backing-up purposes to secure the various adjustments, which makes them very popular machines. This company says that the price generally paid for lumber for backing-up purposes will offset the price of one of these adjustable molds within two weeks after same has been installed.

This company has issued a special catalogue on its "Good Luck Cement Workers' Tools," and is said to have the most complete line of sidewalk tools ever offered to the trade.

"RAPID" MOTOR VEHICLES.

The tendency of the times is all toward the motor driven vehicle for commercial purposes. Their use has made such remarkable strides forward, especially during the past year, that it may be safely predicted that the date is not far distant when the horse will be relegated to other classes of work.

At Pontiac, Mich., there is being manufactured a line of commercial vehicles that has pushed its way up to the front by sheer force of merit and intrinsic worth. This is the "Rapid" line, and is manufactured by the Rapid Motor Vehicle Company, of that city. This car has established a most enviable record for satisfaction with its users. It is so generously good that as a matter of fact it has been its own best advertiser—one car in a community often sells others. A noteworthy fact that is interesting to state in passing is that the Rapid Motor Vehicle Company has never received a complaint about any of its cars—truly a rare record. This is largely due to the fact that the designer of the "Rapid" car is a thoroughly practical man in all gasoline motor mechanics, and has made a study for years of the gasoline motor particularly applied to the strains and exigencies of commercial usage. To this more than to any one thing is due the fact that although this firm gives a strong guarantee with every car, the best point about this guarantee is that it is never needed.

The following stock patterns comprise a part of the "Rapid" line of vehicles:

Open and top delivery wagons, platform trucks, with or without stakes; portable ton express, 10-20 and 25 passenger sightseeing cars, and 16 and 22 passenger wagonettes.

The Rapid Motor Vehicle Company want it expressly understood that the above line comprises a part only of their regular stock patterns and that their manufacture is by no means confined to these. A very large part of their business consists in making special bodies to order. If a purchaser desires some especially designed body, particularly to suit his business requirements, the "Rapid" people will follow his ideas exactly, make him up a design and submit price.

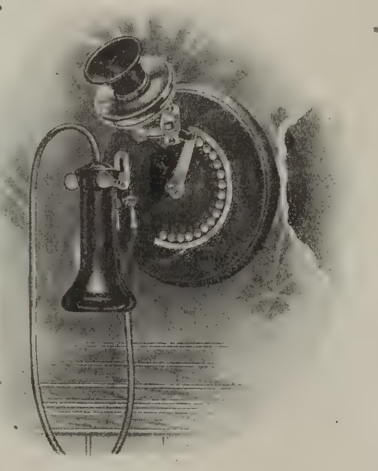
The work and finish are the best possible workmanship, and a wide selection of colors is given. The cushions are made of the finest grade leather and are hair stuffed, and every car is fitted with two side oil lamps, one tail lamp, horn and rubber mat.

"Rapid" commercial cars are being shipped to many parts of the world, and among their recent shipments may be mentioned one to Spain and one to Yucatan, Mexico. The company also has a very active and energetic firm as agents in Helsingfors, Finland, who report that the "Rapid" car is meeting with a most gratifying sale in the Scandinavian country. The Rapid Motor Vehicle Company has other agents in foreign fields, but is still open to connections with live, hustling representatives in several parts of the world, and solicits correspondence to that end. Every "Rapid" car ordered for export is treated with the most extraordinary and painstaking care, both in building and shipping, in order that the foreign purchaser may receive his car in perfect condition. For export shipment the car is taken down and securely crated, thereby obtaining a minimum steamer rate. Upon reaching destination the car can be easily put together by any reasonably skilled workman.

A SYSTEM OF INTERCOMMUNICATING TELEPHONES.

Whatever opinion may be held outside of the United States as to the comparative merits of American and European telephones in general, the fact cannot be gainsaid that in our systems of intercommunicating apparatus we are distinctly in advance of European practice. This follows as more or less a matter of course upon the far wider introduction and more general use of office and house telephones in the United States, naturally leading to developments and improvements not to be sought or expected in territories where comparatively small attention has been paid to similar questions. In the United States the custom of having individual telephones at the elbow of every important or active member of an establishment has developed to the point where their absence is now an even more noticeable fact than was their first introduction. In offices, factories, schools, hospitals, hotels and private residences the individual telephone on every busy desk or in every department or room has become such a convenience that many or most heads of departments would feel absolutely lost and helpless were they to be suddenly deprived of the instruments that save them valuable minutes or hours and many weary steps. To a certain extent, of course, similar practices prevail throughout the world, but nowhere else are they carried to the extent or do they approach in completeness and perfection the common practice in this country.

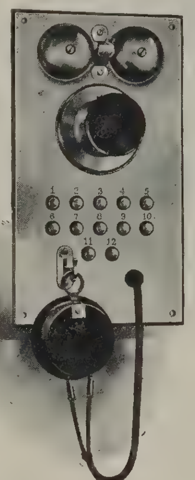
DESK SET.



WALL SET.

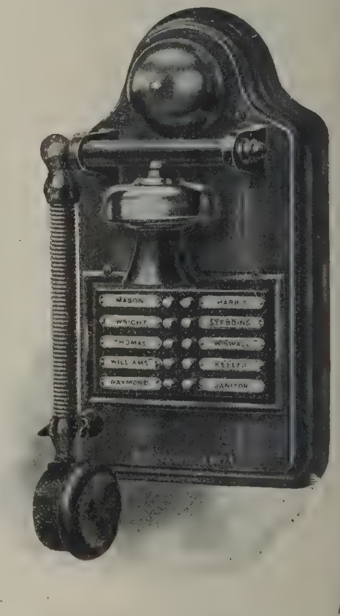
The telephone directory of any American city is liberally sprinkled with prominent stars or asterisks, which indicate "private exchange, connecting all departments." Here is required a "central" operator in the office or factory, who may be called up and will on demand make the required connection with the department desired. Then there is the more modern intercommunicating system, automatic in operation, requiring no operator. These telephones are completely self-contained and call each other or the exchange, if any, at will and *vice versa.*

Communication may be established between two points on the intercommunicating system, while still another point is talking over the exchange line with perfect results. Several conversations can be carried on simultaneously without cross-talk. In a banking house, for example, the President may talk to the Secretary at the same time that the Cashier is confidentially inquiring of the Bookkeeper as to Mr. So-and-So's balance, each individual provided with a telephone being able at will to call up any other person similarly equipped, and converse without danger of being overheard by others on the same system.



FLUSH PATTERN.

Intercommunicating systems are arranged either with plugs or with switches for making the desired connections. On some accounts the latter system is preferable, and is the one which has been chosen to illustrate this article. Types of desk and wall sets are here shown, which give a general idea of the operation of the system, which is known as the "Ness" Automatic. Similar instruments are obtainable in 10 point, 16 point or 20 point sets, that is, there may be the number of stations indicated connected together in the same system. To call any station on the intercommunicating system the switch lever is rotated to the number point representing the call desired and the receiver removed from its hook, which action signals the station wanted. When the conversation is finished the receiver is hung up and the switch lever automatically resets itself. This feature is a distinct advantage over apparatus requiring plugs, which are frequently forgotten when talking has ceased, and which, so long as they remain plugged in for one station, prohibit others from calling up the station at fault. Furthermore, these instruments may also be used as extensions in connection with long distance telephones, thus placing the busy man at his own desk in immediate touch with all parts of the country reached by long distance lines. The convenience and the economy of time and steps afforded by similar installations in factories and large offices are simply inestimable.



VESTIBULE PHONE.

Another and even newer type of instrument of similar character is also here illustrated, and is particularly adapted for residential purposes. This is another product of the manufacturers of the "Ness," to which we have just referred—the Holtzer-Cabot Electric Company, of Brookline, Mass.—to whose courtesy we are indebted for the substance of the present article. This design is made in a flush pattern, the face plate setting flush with the wall, the operating parts being enclosed in a metal case set into the wall, or in a box type in any number of points up to 25. Long distance receivers and transmitters are used, and the buttons permit the instant calling of any desired station.

The so-called "Vestibule 'phone" is designed to be used in apartment houses or localities where one station is desirous of communicating with a number of single point stations.

INGERSOLL WATCHES.

A Story of Evolution.

Although introduced only twelve years ago, nearly fifteen millions of these timepieces have already been sold, and they have so altered conditions that a watch, formerly considered a luxury, is now a necessity that few people are without.

The Start.

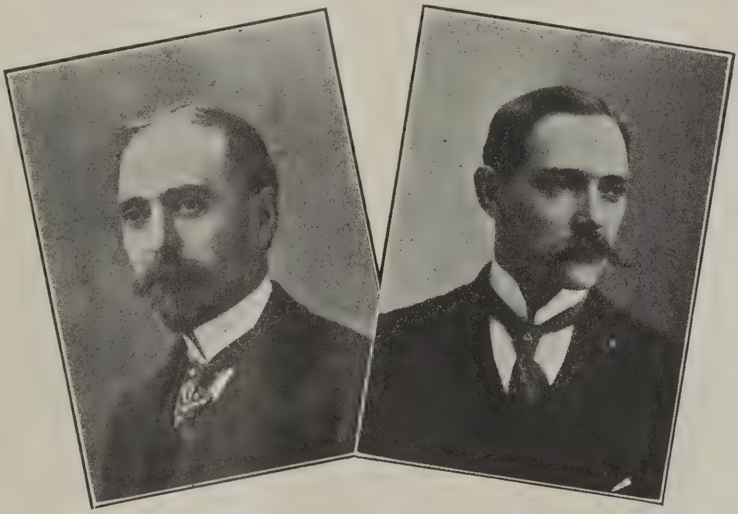
The history of the business dates back to 1879. In that year, Robert H. Ingersoll, then a youth of nineteen, left his home at Delta, Mich., worked his way East on a cattle train, and finally reached New York.

Here with a cash capital of $175, which he had managed to save, by dint of hard labor and personal sacrifice, and a large fund of ambition and energy, he opened a little shop only 6x15 feet in size at No. 92 Fulton street, where he sold rubber stamps and rubber type, made by a process of his own.

Business was good, and when, a year later, he sent for his younger brother Charles to join him, the partnership of Robert H. Ingersoll & Brother began in spirit, although the concern was not formally organized until several years later.

Under the combined efforts of the two brothers trade grew rapidly, until larger quarters became necessary. An entire floor at No. 45 Fulton street was rented, and a small factory opened in Brooklyn.

Here, in addition to the rubber stamps, a few novelties invented by Robert H. Ingersoll were manufactured. The experiment of advertising and selling these by mail was tried and proved successful, and thereafter for some years all their products were marketed this way. Soon a profitable order business was built up, to which several new articles were added, including a "dollar typewriter," "dollar sewing machine" and "dollar camera."


ROBERT H. INGERSOLL. CHARLES H. INGERSOLL.
Two celebrated watch manufacturers.

In 1890 the firm moved to 65 Cortlandt street, where it occupied nearly the whole building, and a little later the manufacturing plant was removed from Brooklyn to Linden, N. J., where a larger factory was opened.

Growth.

The volume of their business now amounted to over $50,000 a year, and they had established a somewhat influential reputation. But it was not until 1894 that a coup was achieved which was destined to make the name of Ingersoll famous and a household word everywhere.

Happening to drop into a small watchmaking establishment one day, Robert H. Ingersoll noticed lying on a shelf a battered and rusty alarm clock, somewhat under the average size. A casual glance suggested to him the possibilities there might be in a similar timepiece reduced in size so that it would fit in the pocket, and which could be sold at a low figure. The idea so impressed him that he purchased the clock, and, taking it home, began a series of calculations and experiments, the result of which was the production of the first "Ingersoll watch." It was called the "Triumph," and was a large, cumbersome affair, popularly regarded as a joke. But the idea was novel and it enjoyed a small sale, which encouraged the Ingersolls to further efforts. They reduced its size somewhat and improved its mechanism, with the result that its sale immediately doubled. Then, realizing its possibilities, they set about developing it systematically. By applying the same general methods that had made their other articles so successful, and by the liberal use of advertising, in addition, they succeeded in rapidly increasing the demand, and the profits which resulted were devoted to improving the watch. Thus the evolution continued, the watch becoming smaller as the sales became larger.

At first its selling price was two dollars, but this was gradually reduced until the one dollar mark was reached. At this point the demand for the watch became so great that it completely eclipsed all the other novelties, and one by one they were discontinued. At the same time it was found that, owing to the great size to which the business had grown, the mail order method was no longer practicable, so the plan of selling to the trade was introduced, and it eventually became the sole means of distribution. It has remained so up to the present time, and there are now over 50,000 dealers throughout the United States who sell Ingersoll watches. Nor has their popularity been confined to this country alone. Europe, the stronghold of the cheap watch trade, has been invaded, and American goods, backed by American enterprise, have triumphed.

A Big Order.

In the spring of 1901 Robert H. Ingersoll went abroad to develop the foreign trade, which had begun on a small scale the year before. On July 5 he cabled as follows:

"Celebrated the Glorious Fourth by closing with Symonds' London stores for one million Ingersoll watches. The largest order ever known in the watch trade. Contract mailed."

This order was commented on by newspapers all over the country as an example of American commercial supremacy, while the foreign press sounded an alarm of a new encroachment in fields supposed to be impregnable there. But it was only the entering wedge. A branch office was opened in London, and a "campaign of education" was started, conducted by Mr. Ingersoll himself, using American methods. How well it succeeded is illustrated by the fact that during the past year more Ingersolls were exported than ever before, and, besides the London office, there are now flourishing branches in Brussels and Berlin.

The domestic selling organization of Robt. H. Ingersoll & Brother is, perhaps, one of the best in America. Their three great distributing centres, located in New York, Chicago and San Francisco, and an army of representatives throughout the country, have so thoroughly introduced the watches that it is hard to find a town or village, however small, which has not at least one dealer handling them.

How to Advertise.

Ingersoll advertising is another interesting and highly developed feature of the business. Begun on a small scale, with a few scattered advertisements in mail order papers; its growth has kept pace with the business, until today the public is just as familiar with it as with the watch itself, perhaps more so. The advertising includes one of the largest single systems of railroad bulletins in the country, numbering about 2,000 in all, and reaching from coast to coast; a vast number of display signs in every city and town, a periodical advertising, reaching over 50,000,000 people yearly, and numerous other devices.

But of all the details connected with the Ingersoll watch of today none is so interesting or so worthy of description as its manufacture. The factory, which is located in the town of Waterbury, Conn., occupies several acres of floor space, and some idea of its size may be obtained from the fact that the watchman, while making his rounds each night, covers a total distance of over twenty-two miles.

Each Watch 150 Parts.

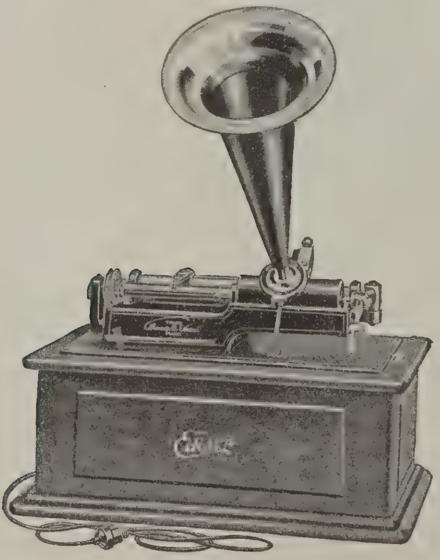
In every Ingersoll watch there are 150 distinct parts, some of them so small that they are almost invisible, and yet the lack of a single one would be fatal to the accuracy. The Ingersoll factory contains 150 automatic machines constantly turning out these parts at the rate of 1,500,000 every day, and during the same period nearly seven miles of mainsprings are produced.

The testing room, where watches are examined and regulated before leaving the factory, is another most interesting place. Here 60,000 watches are kept constantly running, while they are regulated and tested, and the noise made by their combined ticking resembles a hive of millions of bees.

In this great plant are produced daily 10,000 complete, thoroughly tested timepieces, made at the rate of 20 per minute, and yet this supply is inadequate to fill the demand.

MOTOR BOATS.

To anyone interested in cruising with light craft the little booklet now being distributed by the Detroit Gas Engine & Machinery Company, of Detroit, Mich., under the title of "The Log of the Eola," will prove of more than passing interest. The book is a recounting of the experiences of the author on a cruise down the Great Lakes. It is written in a particularly attractive style, and since it is a narrative of actual happenings much useful information may be derived from its pages by anyone contemplating a summer cruise. A copy of this little booklet will be mailed to anyone making application for same.



NEW TYPE OF EDISON PHONOGRAPH.

The new type of Edison phonograph shown in our illustration is called the Alva, after Mr. Edison's second name. At a time when Edison phonographs are becoming almost institutions in the home, there is room for a machine that can be operated by the alternating current so generally found in towns of any size. Children who are fond of phonographs will probably prefer to turn a handle to wind their machine, but there are many adults who will be glad to be spared this small exertion. The National Phonograph Company, although it does not expect the Alva to equal in popularity the Triumph, after which, with the exception of the motor, it is modeled, think it will prove a favorite among the wealthier classes of buyers. It is fitted regularly with an alternating current motor for use on a circuit of 104 to 115 volts, 60 cycles, 7,200 alternations; other voltages and frequencies will be furnished on special order. The Alva is sold for $80.

SUPERIOR TALKING MACHINE NEEDLE.

The assurance is given by the maker of the Petmecky talking machine needles that retailers can make a profit of 225 per cent. on each needle sold.

The extent to which talking machines are used now is something which the public does not know. Stationers, book stores, drug stores, cigar stores, all department stores, besides the regular talking machine stores, would soon find a steady patronage developing if they once put on sale the Petmecky needle.

The needle is to the talking machine what the bridge is to the violin. It conveys the vibrations from the record to the sound box of the talking machine. To do this as it should be done a finely made, correctly shaped needle is necessary. The truth is that the needle is as important as the record or the machine. The Petmecky needle is good for use on ten records. No other needle can be used more than once. This makes the needle sell well in addition to its superiority in tone. It may be used to produce different tone effects by turning it from side to side. It is self-sharpening, too. The multi-tone effect is something that has never been attempted with any needle before. Petmecky, New York, is the manufacturer.

THE "ALUMINO" OIL HEATER.

The superiority of the American made oil heater is receiving practical recognition, not only in Europe and Asia but through South and Central America. This is well illustrated in the experience of the "Alumino" oil heater, made by the Novelty Manufacturing Company, of Jackson, Mich. A few years since their shipments were made by the dozen, and but to few points—now they have annual visits from representatives of large concerns who handle their heaters by the carload, and who come all the way to Jackson to place their orders and personally get in touch with the manufacturers.

The superiority of the "Alumino" oil heater is marked by two very important features which stand out as a model of practical value to the manufacturer who desires foreign trade. There is first the perfection of design by which perfect combustion is assured, thus making it absolutely certain that it will fill all expectations of the user, and back of this is the careful and thorough construction and finish in every detail, so that there will follow durability and service. No matter what the line of the manufacturer may be, if these two features are adhered to such articles will command not only prompt but a continuous market.

To create a market is always an expense, and it is folly to incur such expense if the product marketed is not made to stand the test of service and time. A "half-done" article will never last; carelessness in construction can never be successfully glossed over by polish; the veneer soon wears off, and the consumer feels duped. The expense of creating a market is thus laid waste because confidence has been lost.

The "Alumino" oil heater is a small article, selling at a moderate price, yet by reason of its utility it is one of the household's requisites, and the manufacturers working on this foundation have given to the making of these heaters the same carefulness and thoroughness that could be bestowed upon the manufacture of any article commanding never so high a price. With such reliable completeness in making, the Novelty Manufacturing Company is able to be very positive in its selling claims and in presenting the merits of its heaters through advertising, being absolutely sure that under every test the heater would make good.

TWO FAMOUS CARRIAGES.

One, the vehicle in which the Marquis de LaFayette made his tour of state in 1824, the other the landau which conveyed President Lincoln to Ford's Theatre on the night of his assassination, April 14, 1864, both now the property of the Studebaker Brothers Manufacturing Company, of South Bend, Ind., are exhibited by them at the Jamestown Exposition.

The visit of the Marquis de LaFayette to the United States as the guest of the American people cemented the bond of friendship already existing between France and the young republic of the new world. The death of Lincoln marked the cessation of interstate strife and the beginning of an era of growth and development of a reunited North and South that has made the United States the greatest nation in the world.

The LaFayette carriage was built for the United States Government by a coach maker in Baltimore, Md., for the special use of Marquis de LaFayette upon his tour of the country as the "guest of the nation."

For more than a year his journey was one great ovation, a perpetual and splendid pageant.

Those were the days before the advent of the steam railroad, when the only method of land conveyance was by coach.

The journey of LaFayette extended as far south as New Orleans, as far west as St. Louis, and east to Massachusetts, and his itinerary embraced a total of twenty-one States.

Some years later the carriage was purchased by the Studebaker Brothers Manufacturing Company, and in their possession it has remained, being kept on exhibition at their great repository at South Bend.

This carriage was exhibited at the Louisiana Purchase Exposition at St. Louis in 1904, and at the Lewis & Clark Exposition at Portland, Ore., in 1905. It also was exhibited at the Paris Exposition in 1891.

With the carriage of President Lincoln is associated one of the saddest events in the history of the American nation. It was the last carriage in which he rode when alive. Having been presented to President Lincoln by the merchants of New York on his first inauguration, it was his favorite conveyance, and it carried him to Ford's Theatre on the night of his assassination by Booth.

Some years later it was purchased by the Studebaker Brothers Manufacturing Company, and has since been kept on exhibition by them at their South Bend repository. At the World's Fair at Chicago, where it was exhibited in 1893, it attracted a great deal of attention, as also at the Lewis & Clark Exposition at Portland, in 1905.

The Jamestown Exposition Company adopted Studebaker automobiles, road wagons, street sprinklers, garbage wagons and public utility wagons for use on the Exposition grounds.

REVERSIBLE NIPPER.

The "Nettleton Reversible Nipper" is proving to be one of the best end-cutting nippers on the market today. It is not only constructed so as to cut easier, but each cutter has two cutting edges, which gives the purchaser just twice as much for his money as he can get in any other nipper.

They are made in five sizes, 6, 8, 10, 12 and 14 inches, the jaws tempered for music wire or regular, as desired, the very best of steel being used, and every pair warranted against imperfections. Patented in United States of America and foreign countries, and the fastest selling nipper handled by any dealer, because the buyer gets the same as two pair of nippers for the price of one.

BINGHAMTON WHIPS.

The introduction abroad of the Binghamton Whip Company's complete and assorted line of whips is advancing rapidly, and these well-known manufacturers report recent large sales, which are indicative of a decided demand for the line.

A special point is made by this company in packing its goods for the foreign market, and the dealers handling the line express great satisfaction regarding this feature.

The manufacturing establishment of the Binghamton Whip Company is located at Binghamton, N. Y., within a short distance of the Atlantic seaboard, hence they are in a position to make prompt shipments by any line out of New York city.

Binghamton is popularly known as the "Parlor City," and is one of the most prosperous manufacturing centers of the East.

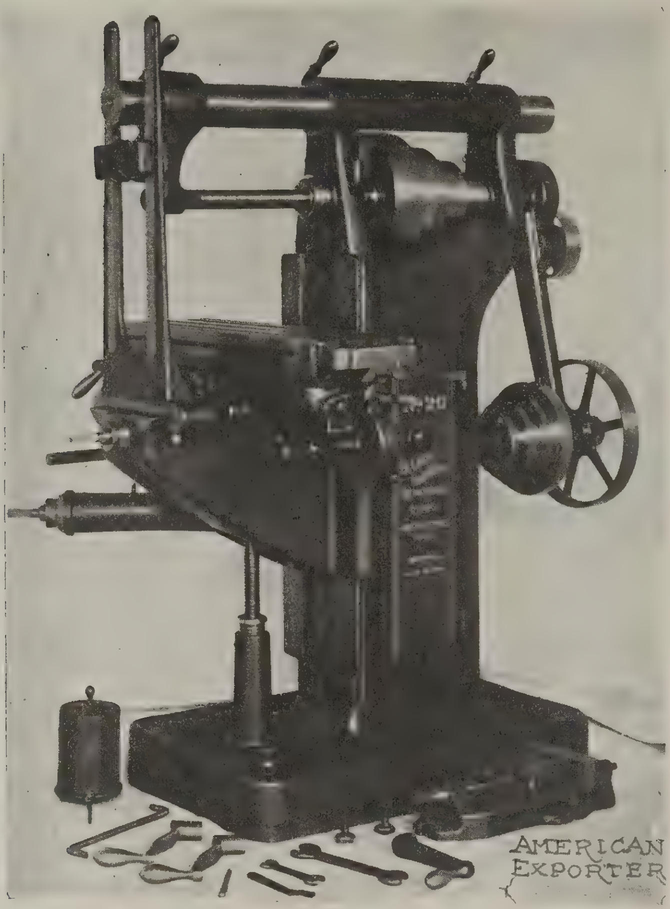
A REMARKABLE FIRE EXTINGUISHER.

In case of fire emergency it is usually the simple, handy and ever ready extingusher that is first brought into use, no matter what other type of appliance may be present, thus catching the fire in its incipiency and preventing the use of more formidable apparatus with all the usual delay and attending water damage. The exceedingly ingenious fire extinguisher known as "Fyricide" is meeting with much favor on account of its quickness of action, simplicity of construction, efficiency and harmlessness. Its makers state that it will not explode, corrode, cake or freeze. It has no mechanism to get out of order, and no acids to burn the flesh or ruin clothing. The preparation is made of chemicals which are pulverized, perfectly compounded and granulated by machinery.

GENERAL LAFAYETTE'S CARRIAGE.

PRESIDENT LINCOLN'S CARRIAGE.

TWO HISTORIC VEHICLES.



NEW MILLING MACHINES.

In the design of the new milling machines illustrated on this page special attention has been paid to the requirements of the manufacturer of small machine parts which are produced in large quantities, such as found in small arms, typewriters, sewing machines and electrical works. In bringing out the new model special attention has been given to the feed works that they may be able to withstand the full power of the driving belt, and at the same time give good service in the rough usage to which these machines are subjected. This new feed is driven by belts which get their motion from the spindle of the machine by means of a train of gears, so arranged that the velocity of the belt is sufficient to drive all feeds that the main belt will stand. The changes of the feed are obtained by four step cones and by interchanging the feed driving pulleys on the back of the machine, giving in combination eight changes from .007 to .100.

The table is operated by worm and hobbed rack, the worm being driven by means of a worm gear of large size and worm of coarse pitch and of correspondingly high efficiency. The arrangement for disengaging the feed is by a new and novel drop worm mechanism, by which the worm is thrown out of mesh with the gear, and leaves in a path at right angles with the axis of same, overcoming the objection of the old style gravity drop worm of clinging to the gear by friction alone. It also equalizes the wear on the worm gear teeth. The worm is also engaged and thrown out of mesh by the same lever, making in all a neat, convenient and positive method of automatically disengaging the feed and stopping the travel of the table at a predetermined point. The table is also supplied with a hand quick return of 4 to 1 ratio, allowing it to be returned to the original position in the least possible time.

The knee of the new model has been lengthened sufficiently so that a harness brace may be used for the arbor and still have a cross range for the table equal to that of the old style machines. This harness is especially worthy of notice and makes for convenience as well as rapidity. It consists of a brace which is gibbed to the knee slide and a clamp that is fastened to the arbor support yoke in a manner that allows it to be swiveled around its centers, permitting the brace to be removed without removing any bolts. This clamp is made fast to the brace by friction, which gives a more rigid hold than the old style bolt washer and slot arrangement, at the same time allowing of a much stiffer brace. The convenience of this device will be at once appreciated by the operator. The arm, which is a solid steel bar, is adjustable lengthwise.

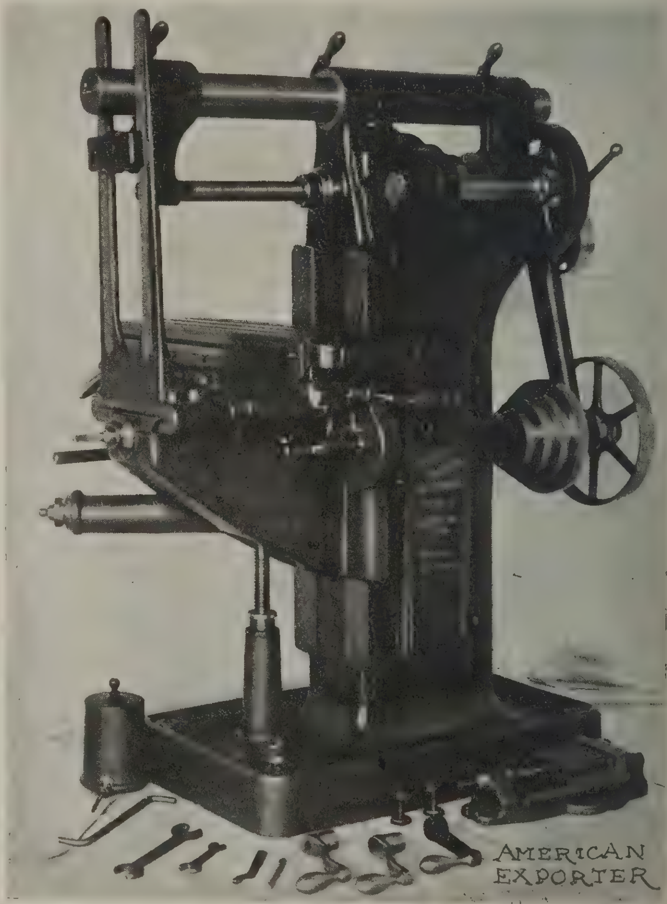
These machines are equipped with a rigid box knee and with a telescopic elevating screw, allowing the machine to be set at any position without regard to beams on floor construction, as the screw does not project below the floor line.

The base of these new model machines has been designed on the same lines as the other Becker-Brainard machines, which are extra heavy, absorbing all vibrations. Two styles are made, No. 25, back geared, and No. 26, not back geared. Their ranges are: Longitudinal feed, 34 inches; cross feed, 8 inches; vertical adjustment, 18 inches; net weight, 1,650 pounds.

The spindle cone and back gears are of the standard Becker-Brainard design, the spindle bearing being cylindrical in form, the wear being taken up by concentric compensating bronze boxes.

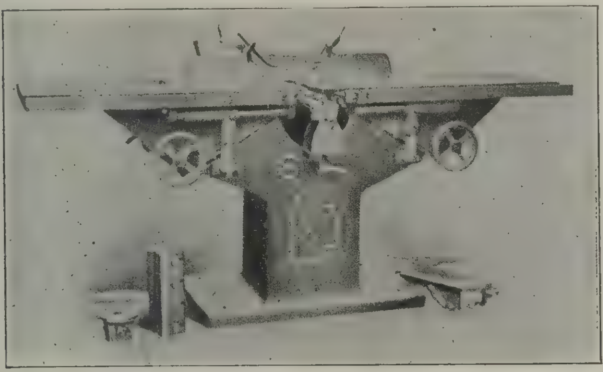
The appearance of the machine has in no way been neglected, since new patterns were made throughout. Great care was given to the symmetrical appearance of the machines as a whole, all corners being well rounded, and the graceful outlines speak for themselves.

The Becker-Brainerd Milling Machine Company, manufacturers of this type of machine, are meeting a heavy demand for their product both at home and abroad.



WOOD-WORKING TOOLS OF UNLIMITED RANGE.

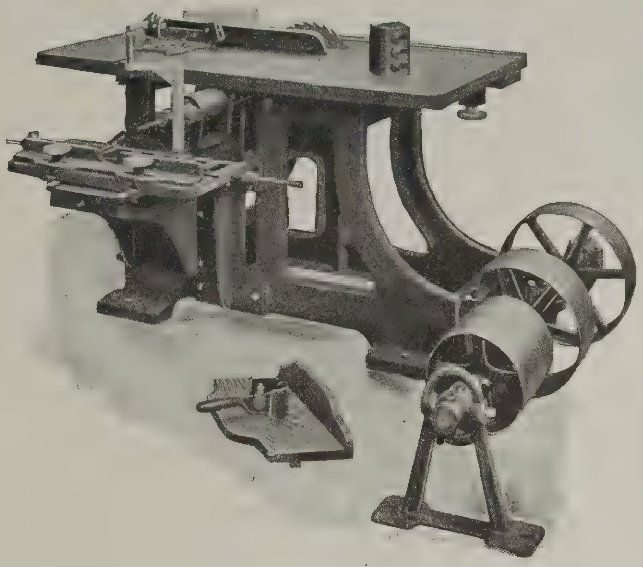
In shops where special tools are overtaxed by unusual pres-ure of work, or in smaller shops, where there is not sufficient vork to warrant the installation of special machines for each istinct purpose, the two tools here illustrated appeal forcibly or approval. Their range in general woodwork is almost un-mited; in fact, their manufacturers, the Cordesman-Rechtin Company, of Cincinnati, Ohio, claim that their range is only mited to the skill of the operator. They are suited to planing ut of wind up to 12 inches and 6 inches wide, making air tight lue joints, chamfering, ripping, cross-cutting, mitering, tenoning, abbeting, boring, etc.; also for graining, dadoing, grooving, onguing, routing, paneling, beading, as well as making flat and ircular moulding work, with suitable cutter heads and fixtures, vhich can be obtained with the machines at small extra cost.



ROYAL STANDARD WOOD WORKER.

The Variety Wood Worker, as shown, is entirely of iron nd steel, ribbed and braced to insure strength and indefinite lurability when properly cared for. The table is cast whole and grooved for the reception of the sliding tongue. The sliding and upplementary plates are milled off on all four sides and fit per-ectly true.

The "Royal Standard" Universal Wood Worker unites in implified form weight, strength, easy and accurate manipulation f adjustable parts, economy in floor space and power, all at a easonable price, and will render infinitely greater service than he most skilled mechanic. Both machines are equipped with a variety of attachments, adapting them to almost every use demanded in a wood-working establishment.



VARIETY WOOD WORKER.

ABRASIVES VS. DIAMONDS.

In every tool room there is an emery wheel, or a good many of them. How shall they be cut, shaped, trued? The problem has become a serious one following the advent of the present exorbitant prices of black diamonds. Then, too, diamond dressers are easily lost and broken. A very useful and convenient dresser intended to replace the black diamond has been enjoying phenomenal popularity of late among all the leading American tool shops under the name "Diamo-Carbo." The Desmond-Stephan Manufacturing Company, of Urbana, Ohio, are the sponsors for the new device, which is already receiving generous attention from up-to-date foreign merchants and manufacturers. The new dresser consists of a steel tube filled throughout its entire length by a vitrified process, with an abrasive of sufficient hardness to cut and shape emery wheels. With proper care it is said to last indefinitely; is claimed to be superior to a black diamond in many respects, although costing but little in comparison.

TRADE PUBLICATIONS

Six-Wheel Type Switching Locomotives.—The American Locomotive Company has just issued the ninth of its series of pamphlets covering the standard types of locomotives. As the itle indicates, this number of the series is devoted to six-wheel switching locomotives, and contains half-tone illustrations and he principal dimensions of twenty-six different designs of this ype. The designs illustrated range in weights from 102,000 to 176,500 pounds, and are adapted to a variety of service conditions.

Carriage Makers' and Blacksmiths' Tools.—The Silver Manufacturing Company, Salem, Ohio, is distributing an unusually handsome and complete catalogue and price list of carriage makers' and blacksmiths' tools, including hub boring machines, spoke tenon machines, band saws, drills, bolts and power and portable forges.

Electrical Signs and Specialties.—The Federal Electric Company's, Chicago, Ill., bulletins give complete details, also prices, of its adapters, brass shade holders, brass socket caps, clusters, electric signs, festoons, fixtures, sockets, shades, etc.

The Ideal Concrete Machinery Company, of South Bend, Ind., is now distributing its handsome new catalogue for 1907, and it unquestionably is one of the most complete and comprehensive works of the kind ever issued. It describes in detail the company's well known hollow block machines, and shows the unlimited variety of ways in which the blocks made on these machines are adapted to the construction of large buildings, bridges, power plants, docks, tunnels, foundations, etc. The book is one of much value to all users of concrete machinery; it is profusely illustrated, and is replete with information on hollow concrete block construction. For single copies of this catalogue the company is asking the nominal fee of 25 cents.

Concrete Block Machines.—The Miracle Pressed Stone Company, Minneapolis, Minn., has just issued a 115 page catalogue, profusely illustrated, containing most useful and readable information concerning the Miracle machines, molds and tools.

Whips.—The Binghamton Whip Company, Binghamton, N. Y., issues a complete catalogue describing and listing its line of whips.

PUBLISHER'S PAGE

AMERICAN EXPORTER

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The AMERICAN EXPORTER, established more than thirty years ago, is the pioneer and the most extensively circulated publication devoted to furthering of relations between importers and merchants the world over and manufacturers of American goods. It is published on the first of each month in English and on the fifteenth in Spanish (EXPORTADOR AMERICANO).

The AMERICAN EXPORTER is both independent and impartial. Its publishers have no connection with any manufacturing concern, export house or other business except publishing, and hence have no outside interest to serve. The editorial management is separate and distinct from the business department.

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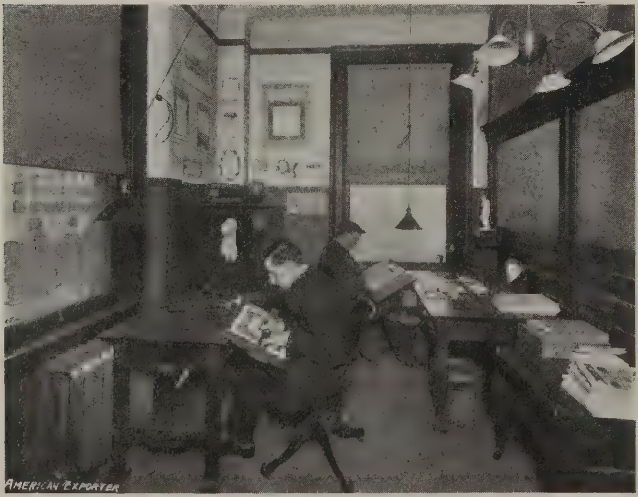

SECTION OF ART DEPARTMENT.
Of the AMERICAN EXPORTER, where the art work for the reading and advertising pages is done.

FURTHER IMPROVEMENTS.

For the convenience of foreign buyers reading the AMERICAN EXPORTER we have made two changes in the alphabetical directory of advertisers, the first being the use of bold initial letters at the beginning of each division of the alphabet, to aid in reaching a desired name quickly, and the other the printing of the names of certain standard machines or goods which, as is often the case, are manufactured by a firm whose name gives no clue to the product. There are many cases where a machine, musical instrument or line of goods is far better known than the name of the maker and is well known to a foreign buyer, who may not be acquainted with the manufacturer's name. It is for such cases that this second improvement has been made.

The changes which were made beginning with the August issue in the reading matter have met with unqualified approval, so much so that we are encouraged to make further improvements, in order that the paper may attain an even higher standard than now as a commercial journal of worldwide interest. Our editor is gathering valuable data while abroad concerning the desires of our readers, and the suggestions which he has received from them are being carefully noted, and some have already been acted upon.

OCTOBER ISSUE.

The October issue of the AMERICAN EXPORTER will devote especial attention to household furniture and goods. The department "With the Manufacturers" will contain carefully written and well illustrated descriptions of many of the latest and most popular offerings in this line.

Among the more general articles which the October issue will contain may be mentioned "Philadelphia as a Commercial Center," handsomely illustrated with recent photographs of the most important points in this famous city; "The Utilization of Lumber By-Products," a very interesting account of how the odds and ends of lumber, formerly wasted, are now made use of with profit for the manufacture of toys, clothespins, wood pulp and even silk; and a discussion of the relative values of gasoline, kerosene and denatured alcohol as fuel for motor-boats, an article which should prove of especial interest in view of the great attention which is now being paid to the motor-boat industry. As in the past two numbers, particular attention will be paid to illustrating the various articles appropriately.

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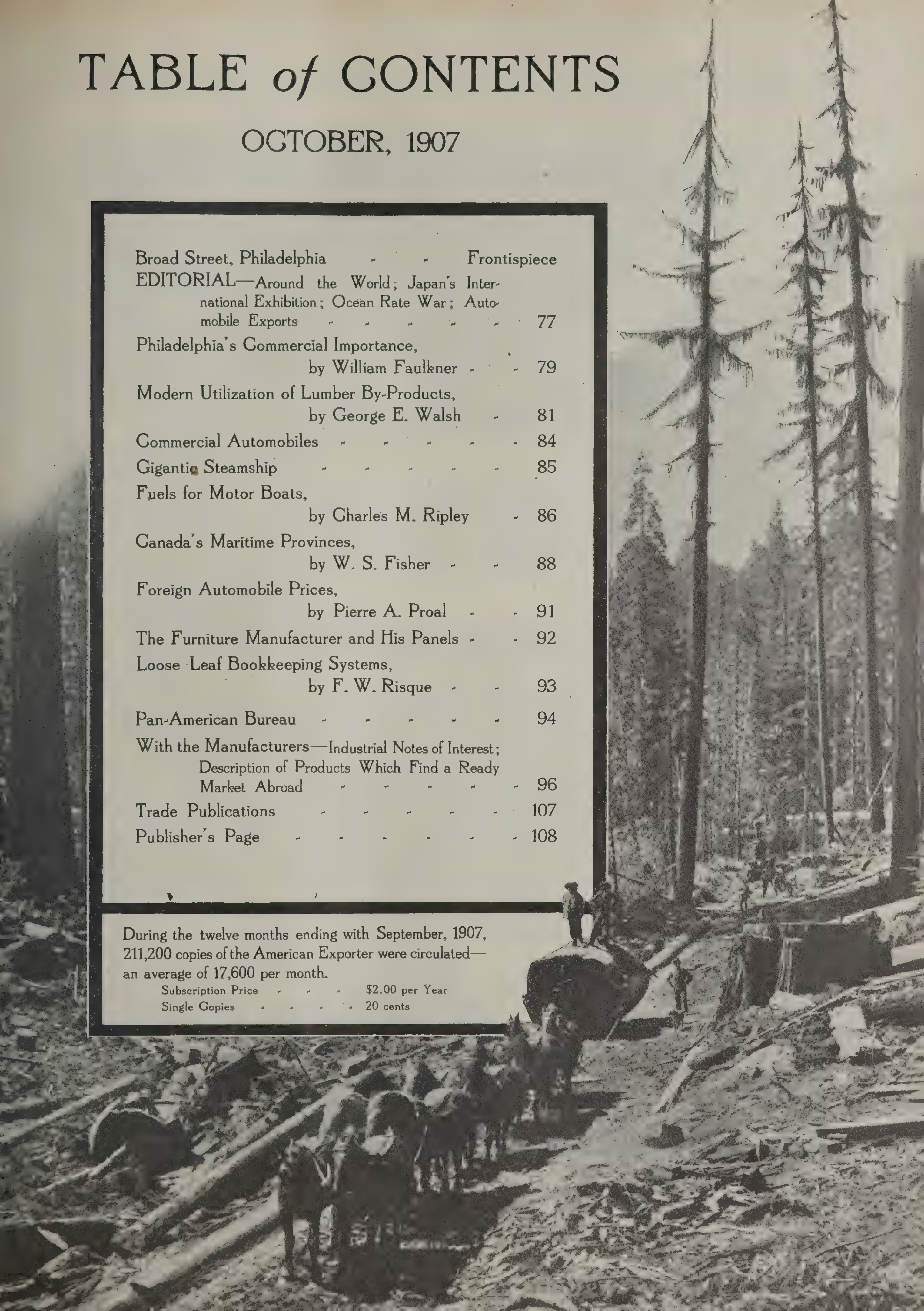

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During the twelve months ending with September, 1907, 211,200 copies of the American Exporter were circulated—an average of 17,600 per month.

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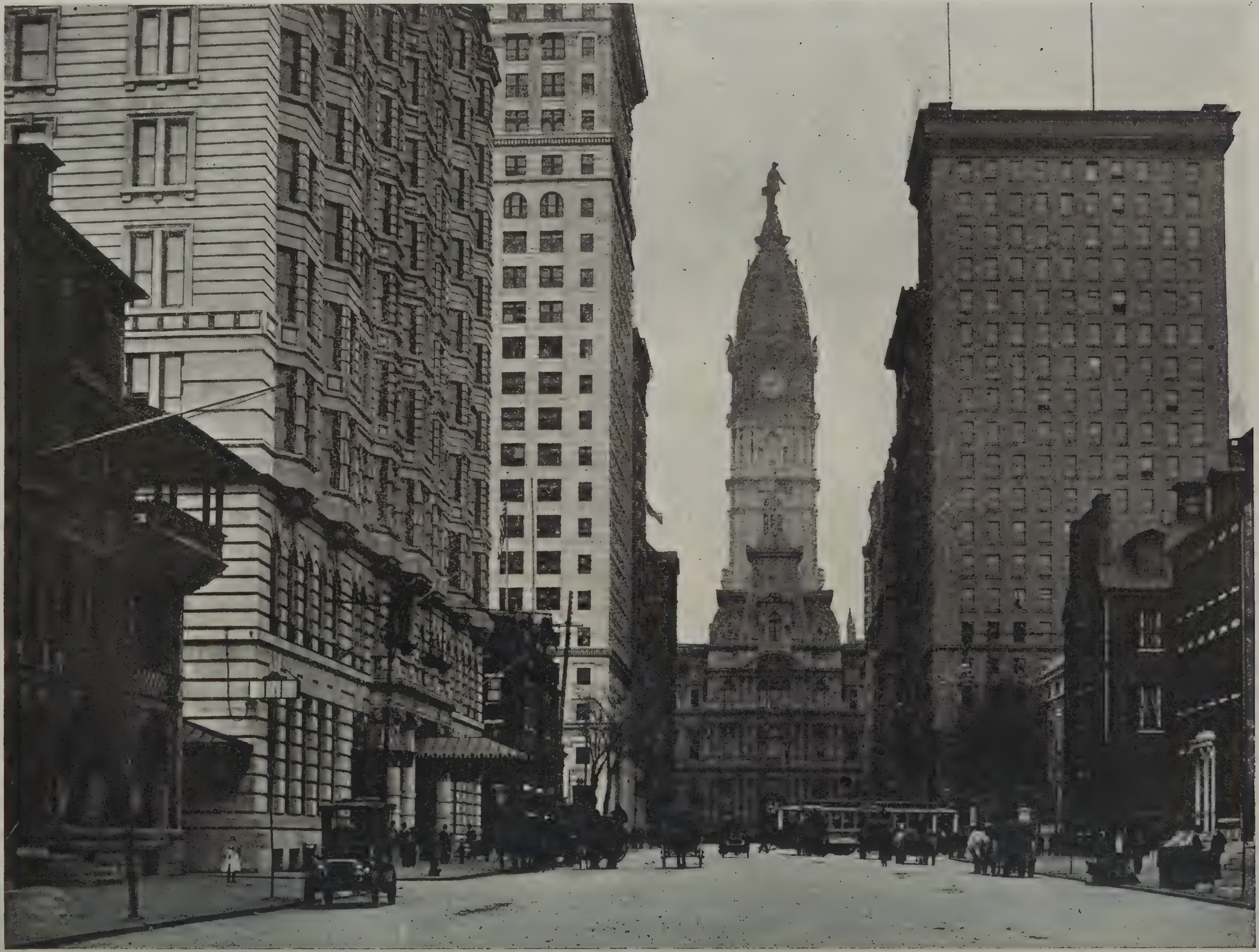

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BROAD STREET, PHILADELPHIA,

Showing the City Hall, the Bellevue-Stratford Hotel at the left and the "North American" Building at the right. (See Page 79.)

AMERICAN EXPORTER

EDITORIAL

The AMERICAN EXPORTER is both an independent and impartial trade journal. Its publishers have no connection with any manufacturing concern, export house or other business except publishing and, hence, have no outside interest to serve. The editorial management is separate and distinct from its business department.

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HON. WM. H. TAFT.

AROUND THE WORLD.

Not only his American friends, but those who knew him when he shouldered the task of reorganizing the Philippine Islands, and those who met him on his trip to the Orient two years ago, will wish Secretary Taft a prosperous voyage across the Pacific, a pleasant journey over Asia and Europe, and a safe return by way of the Atlantic, on the around the world trip which he begins September 12. The *entente cordiale* between the United States and the countries he visits should be materially strengthened by his trip, which will include Japan, China, the Philippines, the steppes of Siberia, Russia and Germany.

The complete itinerary of the trip is as follows:

Leave Seattle on September 12; due Yokohama on September 25; due Kobe on September 29; due Nagasaki on October 4; due Shanghai on October 6; due Hongkong on October 11; arrive Manila on October 14 (via the McClellan); leave Manila on November 4; arrive Vladivostok on November 11; leave Vladivostok on November 12; arrive Irkutsk on November 16; arrive Moscow, staying two days, on November 23; arrive St. Petersburg, staying two days, on November 26; arrive Berlin, staying two days, on November 29; take steamship at Cherbourg about December 4; arrive New York about December 10.

JAPAN'S INTERNATIONAL EXHIBITION.

The Japanese Government is just now busily promoting what is to be the greatest international exhibition ever held in Japan. It will be opened in the metropolitan city of Tokio on the first day of April, 1912, and closed on the last day of October, thus enabling visitors to see the country in its far-famed cherry season or in the beauty of its chrysanthemum bloom. Every facility is being given to make the exhibition fully adequate to the requirements of all the governments and peoples of the civilized world, and their hearty co-operation is invited in order to insure complete success. Some idea of the dimensions of the exhibition may be obtained from the fact that the grounds will comprise an area of no fewer than 250 acres, of which about 30 will be occupied by buildings. While ample scope is being given to every possible class of exhibit, special attention is being devoted to those sections which concern science, both applied and pure, including education, electrical appliances and machinery of all descriptions. One of the more important objects of the exhibition, of course, will be that of displaying to visitors from other parts of the world the civilization, industrial developments and manifold resources of Japan itself.

OCEAN RATE WAR.

"It is an ill wind that blows nobody good"—and the exporter and importer can only look with glee at the present desperate struggle of the steamship barons to make transatlantic passenger rates within the reach of all. Those whose business occasionally takes them across the great pond should make hay while the sun of rate cutting shines. Perhaps lower steamship rates will have the same effect on traffic which reduced railroad rates carried on in many parts of the United States—the lower the rates the greater the traffic and the larger the profits for the railroad. If this happy condition were to arise it would probably mean more steamships and lower transatlantic freight rates—a thing very much to be desired.

INEVITABLE EXPANSION.

The subject of America's export trade has grown so rapidly in the past few years that the announcement printed on the Publisher's Page this issue is the natural outgrowth of conditions. It has become impracticable to print in the periodical itself reading matter applicable to our two different classes of readers—the foreign buyer and the American manufacturers. Hence the determination hereafter to print a Domestic Supplement for the latter reader. In this way the foreign reader will receive only matter of interest and value to him, while in the supplement will be printed information such as American manufacturers desire concerning ways and means of handling their export trade.

AUTOMOBILE EXPORTS.

In connection with Mr. Proal's remarks in another column, special interest attaches to the official report on the United States' foreign trade in automobiles in the fiscal year just ended.

Automobiles valued at more than 10 million dollars passed through the ports of the United States in its foreign trade in the fiscal year just ended. Five and a half million dollars' worth of these were exports and 4½ million dollars' worth imports. In addition to the 5½ million dollars' worth of automobiles exported to foreign countries, abut $100,000 worth went to Porto Rico, $160,000 worth to Hawaii and about $5,000 worth to the Philippines.

The foreign trade in automobiles shows a rapid growth, especially on the export side. The value of exports of automobiles and parts thereof was, in 1902, a little less than 1 million dollars; in 1903, 1¼ millions; in 1904, 1¾ millions; in 1905, 2½ millions; in 1906, 3½ millions, and in 1907, 5½ millions of dollars. On the import side the value of automobiles brought into the United States has only within the last two years been sufficient to justify the Bureau of Statistics of the Department of Commerce and Labor in stating their imports separately, the value of automobiles imported in the fiscal year 1906 being $3,844,000, and of parts thereof $400,000; while in 1907 the value of these vehicles imported was $4,041,000, and of parts thereof $801,000. Thus the growth in exports of automobiles is much more rapid than that in imports, and the value of automobiles exported seems likely in the near future to exceed by far the value of those imported.

France, Italy, the United Kingdom and Germany supplied the 4 million dollars' worth of automobiles imported during the year, nearly 3 million dollars' worth of this being from France, a little less than a half million dollars' worth from Italy and the remainder about equally divided between the United Kingdom and Germany. Of the 5½ million dollars' worth of automobiles exported during the past year, 1½ million dollars' worth went to the United Kingdom, a little over 1 million dollars' worth to Canada; a little less than 1 million dollars' worth to Mexico; a half million dollars' worth to France and a quarter of a million dollars' worth to Italy. Thus about 2½ million dollars' worth of the automobiles exported in 1907 went to Europe, a little over 1 million dollars' worth to British North America, 1¼ million dollars' worth to the countries south of the United States, including Mexico, South America and the West Indies, and about $350,000 worth to Asia and Oceania.

To nearly all countries the exports of automobiles during the year 1907 show a marked increase over those of 1906. To the United Kingdom the exports in the fiscal year 1906 were but $948,995, and in 1907 $1,530,204; to France, in 1906, $282,317, and in 1907, $512,524; to Canada, in 1906, $648,438, and in 1907, $1,175,334; to Mexico, in 1906, $422,626, and in 1907, $812,639; to the West Indies, in 1906, $241,353, and in 1907, $207,390, and to British Australasia, in 1906, $160,944, and in 1907, $207,715.

The growth in exports of horseless vehicles to the tropical sections of the world has been strongly marked. While the value of shipments of this class of merchandise to the United Kingdom only grew from $671,553 in 1902 to $1,520,304 in 1907, similar exports to Mexico grew from $27,710 in 1902 to $812,639 in 1907; those to the West Indies, from $11,152 in 1902 to $207,390 in 1907; those to South America, from $15,353 in 1902 to $204,211 in 1907, and those to British Australasia, from $9,581 in 1902 to $207,715 in 1907. Exports of vehicles of this class to the tropical sections of the world were in 1907 more than ten times as much as in 1902, while those to other sections of the world were in 1907 but about five times as much as in 1902. About one-fourth of the automobiles exported from the United States are sent to the horseless areas of the world, including in this term China, Japan and the Tropics; while from the United Kingdom nearly one-half of the 2½ million dollars' worth of automobiles exported in 1906 were sent to the Tropics or the Orient.

The United States occupies second rank among the commercial nations as an exporter of automobiles, being exceeded only by France. Figures just compiled by the Bureau of Statistics present the latest available data for France, Germany, the United Kingdom and Italy. In 1905, the latest year for which figures are available, the total export of horseless vehicles from France was valued at $19,400,564, representing shipments to more than a score of countries. Of this total, 9½ million dollars' worth went to the United Kingdom, 2 million dollars' worth to Belgium, 2 millions to Germany, 1¼ millions to the United States, 1 million to Italy, two-thirds of a million to Argentina and a half million dollars' worth to Algeria; while other French colonies, India, Egypt and certain European countries absorbed the bulk of the remainder. Germany exported in 1905 automobiles to the value of $3,977,000, of which $3,397,000 represented the value of passenger and $580,000 that of freight automobiles. The principal countries of destination were, for the year named, the United Kingdom, $1,157,000; France, $821,000; Austria-Hungary, $605,000, and Belgium, $300,000; while to Italy, Switzerland, Japan and the United States the exports averaged about $150,000 each.

From the United Kingdom the exportations of automobiles in 1906, the latest available year, were valued at $2,410,859, most of the machines being marketed in British colonies or possessions. To Australia, the value of the exports in 1906 was $434,486; to New Zealand, $303,928; to Bombay, $290,447, and to the United States, $177,661. Italy's exportations of automobiles in 1905 were valued at $704,000, of which $406,000 worth went to France and $168,000 to the United States.

The value of automobiles entering international commerce is now about $35,000,000 per annum, and rapidly increasing.

PHILADELPHIA'S COMMERCIAL IMPORTANCE.

Second Port of the United States and a Vast Manufacturing Centre With Great Shipyards and Railway Shops.

BY WILLIAM FAULKNER.

The second port of the Atlantic coast in size and importance and the third largest city in the United States, Philadelphia has a commanding position from an industrial standpoint, and has long been noted not only for the extent but the quality of its manufactures. Situated near the mouth of the Delaware River and in the midst of one of the most thickly populated and most prosperous sections of the country, it is but natural that the city should have attained an important industrial position. As a port she is second only to New York City, having direct connections with Glasgow, Liverpool, London, Swansea, Hamburg, Antwerp, Jamaica and the West Indies. Coastwise steamships ply between Philadelphia and Boston, Savannah, Baltimore, Norfolk and Providence. Two large rivers touch Philadelphia—the Delaware and its great tributary, the Schuylkill.

In 1891 there began a general improvement of the harbor and waterways of Philadelphia, which is now completed, and which has added materially to the commercial importance of the city. A channel averaging over 400 feet in width runs through all the shoals from the city to the sea, having a depth at low tide of not less than 26 feet.

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INDEPENDENCE HALL,
Birthplace of American Independence.

At the entrance to Delaware Bay, at the mouth of the river, is the famous Delaware breakwater, forming a harbor of refuge suitable for vessels of the deepest draft. The improvements of the harbor proper have included removal of the islands that used to obstruct the river between Philadelphia and Camden and the transference of a large part of their material to enlarge and elevate the area of League Island and to fill in and make useful the flat lands along the shore.

A reconstruction of the Philadelphia water front was begun in 1894, and has included vast improvements in the facilities for large steamships.

Philadelphia as seen from the Delaware River gives one an excellent idea of the shipping and other industries of the city. At Port Richmond, for instance, are the vast export and coal delivery yards of the Philadelphia & Reading Railroad—the terminal of a railway system which taps the enormous coal fields of Pennsylvania. Kensington nearby is a wilderness of mills, factories and grain elevators, while along the wharves is a veritable forest of masts. Here will be seen coastwise schooners used especially in the coal and lumber trades. Nearby also are Cramp's shipyards, where a great many of the largest American steamships and naval vessels have been built. In fact, Philadelphia has always been a leader in naval architecture, and the Cramp yards were started in 1830, since which date some 400 vessels have been built in these yards.

Philadelphia, the City of Brotherly Love, stands as a perpetual monument to the industry and thrift of the Quakers, and especially to William Penn. Much of its early progress was due also to the large number of Germans who settled here in the early days, and their influence is still prominent in all walks of life in Philadelphia and in the State.

Four great railroads have direct entrance into Philadelphia. The largest of these is the Pennsylvania Railroad, whose terminal is the great Broad Street Station, a magnificent building of modern Gothic architecture, eleven stories in height. Trains enter and depart from this station over an elevated viaduct. They run into one of the largest railroad train sheds in the world, covering an area of 707 feet in length and 307 feet in width. The framework of this structure is composed of 60,000,000 pounds of iron, and the glass of the roof would cover an area of 1¾ acres.

Philadelphia is 22 miles long and 6 miles in width. Market street is considered the center of the city, and here are found many of the principal shops and office buildings. Chestnut street has almost equal importance commercially.

One of the chief interests of Philadelphia lies in the

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THE CRAMP SHIPYARDS,
Where Famous Ocean Liners and Naval Vessels Have Been Built.

historical associations of the city. Some of the most important and stirring movements in the early history of the cause of American independence took place in Philadelphia, and the city was for a time the national capital. Among the buildings which have a special interest in this regard may be mentioned Independence Hall, built in 1729 as the Colonial State House. In this building were arranged the preliminaries of the establishment of the United States as an independent nation. Here the Declaration of Independence was debated and proclaimed in 1776, and here the first Congress met. The Supreme Court House nearby was built in 1791 for the Supreme Court of the United States, when it was supposed that this city was to be the national capital. Congress Hall has even greater interest. Before the Revolution the site of this building was occupied by a wooden shelter for visiting Indians. The present building was completed in 1790, and was for ten years occupied by the Congress of the nation. Here George Washington was inaugurated President in 1793 for the second term. These are only a few of many buildings in Philadelphia which have important historical associations.

As a manufacturing center Philadelphia makes about everything that humanity needs in the way of manufactured goods. It was but natural that in the early days of the development of the New World Philadelphia should take a leading position, for the city numbered among its settlers large numbers of trained mechanics from England and Germany, and for many years the city from a manufacturing standpoint advanced more quickly than either New York or Boston. At the present time the city leads in the manufacture of steamships, locomotives, street cars, electrical apparatus, hardware, paints, and in a lengthy list of manufactured goods.

Financially the city is deeply interested in the coal and iron trades and in railroading. The Philadelphia captains of industry were the first to establish a successful American transatlantic steamship service, and they at the present time dominate the railroad situation in half a dozen States.

From an export standpoint the city takes precedence especially in the exporting of raw materials, although the city has not the steamship facilities which New York and Baltimore possess. As the terminal of a great transcontinental line, she exports vast quantities of coal, iron, steel and grain, while in addition the high grade of manufactured goods for which the city is noted has aroused a world-wide demand for Philadelphia products.

As a manufacturing center Philadelphia is blessed by a most advantageous position geographically, as the city is only three hours distant by rail from three of the largest cities in America—New York, Baltimore and Washington. Hence its factories can compete to advantage in the great markets which these cities afford. In addition she is within easy reach by fast freight routes of a number of cities of only a little less importance—cities which naturally look to her for a large list of goods. Among these cities may be mentioned Trenton, Newark, Harrisburg, Reading, Pottstown, York, Richmond, Norfolk, Wilmington and Camden. The city's situation also puts her in a splendid strategic position as regards Southern trade.

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POST OFFICE BUILDING AND VIEW DOWN CHESTNUT STREET.

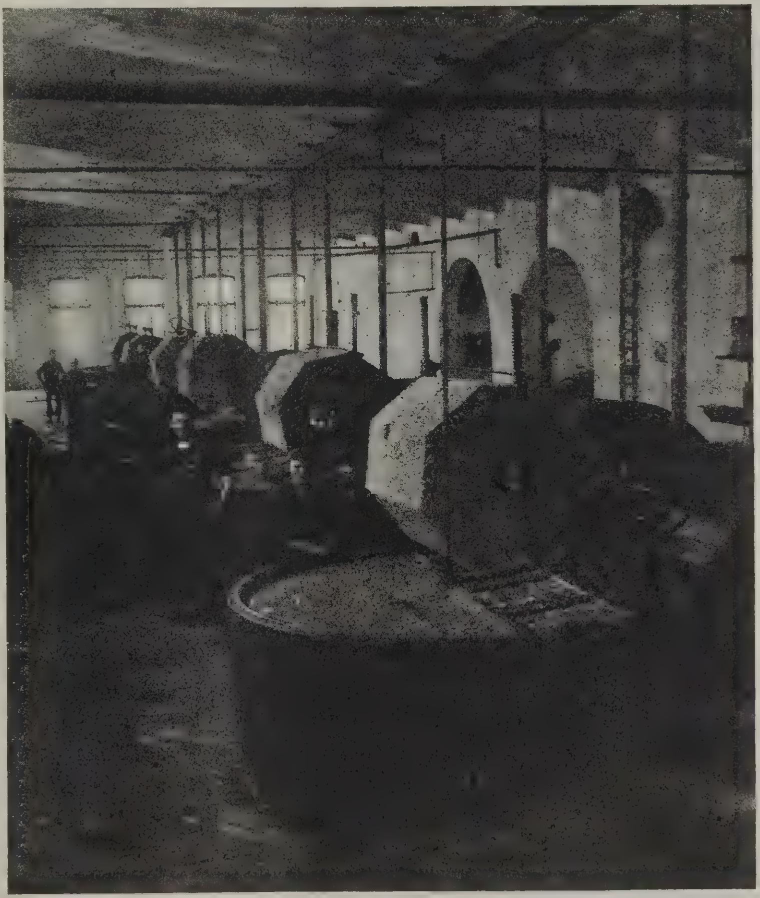
MODERN UTILIZATION OF LUMBER BY-PRODUCTS.

How Scientific Economy Saves Vast Sums Formerly Wasted—Making of Wooden Novelties, Wood Pulp and Veneer.

BY GEORGE E. WALSH.

YEAR by year the progress of modern inventive skill and mechanical genius reclaims waste products formerly considered worthless commercially, turns them to value, and the waste product of the past becomes the commercially useful by-product of the present.

In no line of industry is this shown more clearly than in that of lumber and wood working. In the past the waste of American forests has been enormous. Millions of cords of wood were burned, which today would be used in a variety of commercial purposes. Within a decade there has been built up an enormous industry, which uses for raw material either the second growth trees in regions where practical lumbering has ceased or the waste of saw mills and furniture factories. This industry has been brought to its present state of efficiency chiefly through the invention of special machinery for manipulating the wood products in such a way that the cost of labor is reduced to a minimum. Every year new machines are patented which tend to increase the output of these forest manufacturing concerns.



From a stereograph copyrighted 1907 by Underwood & Underwood.

WOOD PULP VATS.

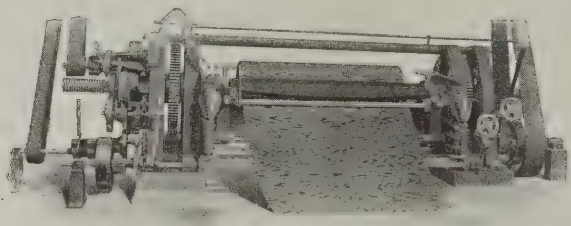
In the Maine woods there are a number of "novelty" factories which turn out wooden toothpicks, wooden toys, wooden skewers and wooden spools literally by the hundreds of millions. Many of these articles are made from the by-products of the lumber mills, in many cases using small limbs and boughs which otherwise would be of no value except as fuel. In the vast Northwestern forests of Michigan, Wisconsin and Minnesota the by-products of the large furniture factories are likewise utilized for manufacturing innumerable small useful products. Toy wooden wagons, soldiers, dolls' houses and children's furniture are made from the left-over materials of the furniture factories. In the aggregate these wooden novelty mills represent products valued at several millions of dollars.

Machines turn out clothespins, toothpicks and wooden spools at a rate which makes all hand competition fruitless. These articles are shipped to almost every civilized country on the globe. One Maine factory is capable of turning out annually several million bundles of toothpicks, 2,000,000 skewers used in the butchers' trade, and nearly as many clothespins. The raw material for these articles is obtained at a cost which makes the profits large.

Hand made wooden toys have never been manufactured in this country to any great extent, but machine made and machine painted wooden toys have entered largely into competition with those from Germany and the Tyrol.

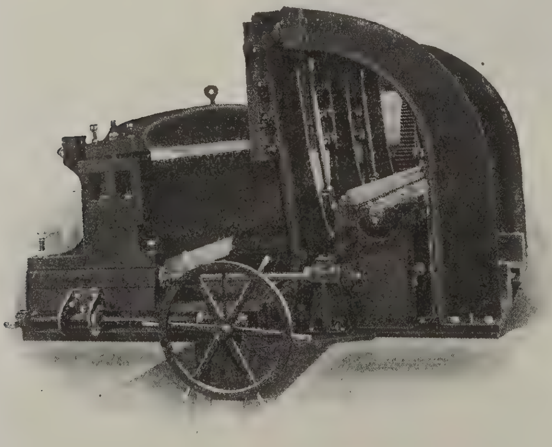
The painting of these wooden toys made in the novelty mills is done almost entirely by machinery. Over a hundred flat pieces are placed in a case, and the painting of one color on a side is achieved by a simple closing of the case. The liquid paint is fed through small holes and regulated so that no surplus is wasted. The cost of the operation is limited to the wages of one operator who feeds the machine and to the cost of the paint. All through the summer season these wooden toys are manufactured on a large scale and shipped to all parts of the world for the midwinter holidays.

The perfection of the modern veneer machine has worked wonders in our forest products. The veneer machine has been able to economize in the use of our wood for commercial purposes. The most striking field of operation in the past with the veneer machine has been in the manufacture of berry and vegetable baskets, crates, boxes and similar commercial packages. These have been turned out by the hundreds of millions, and wherever trade is carried on there we find the non-returnable package for conveying berries, fruits, vegetables and dairy products from the farm to the consumer. Veneered wooden plates and boxes for campers are manufactured extensively, and they are now shipped to many other countries. The need for baskets and light packages is so great today that the factories making them are taxed to their utmost.

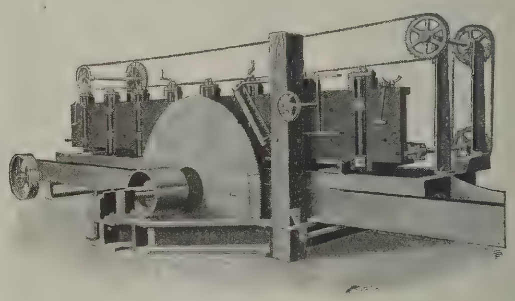


VENEER MACHINE,
Showing Strip of Veneer.

The manufacture of wooden covering or facing of thin lumber for the interior trim of ships, railway carriages and houses has become almost as extensive as that of packages. The veneer machine cuts the lumber into sheets ranging from one-sixteenth to three-eighths of an inch in thickness, and these sheets are used for the interior trim in place of solid wooden furnishings. This work ranges all the way from cheap stock of soft wood up to the veneered hard wood used in the manufacture of the best cabinet work. Built-up furniture has followed as a natural result. By placing several sheets of the veneered wood together and gluing them a strong, flexible and durable surface is obtained. With the grain running in opposite directions the danger of warping, cracking or splitting is almost eliminated. A facing of veneered stock is thus used extensively for good cabinet work. The built-up work consists of a core of soft or light wood overlaid with a surface of veneered hard wood. When finished the furniture is as durable as solid hard wood pieces, much cheaper and equally satisfactory in its polished surface. Great numbers of built-up doors, window frames and house trimmings are made in this way at the factories and shipped to all parts of the world. Built-up articles of furniture are as satisfactory as the doors and window frames. They are much lighter in weight, fully as handsome and almost as durable. American made veneered furniture has been shipped to Europe in the last few years, where it has attracted a good deal of attention because of its price and handsome appearance. In catering to the needs of foreign furniture buyers American furniture manufacturers have in the last two years sent agents abroad to study the patterns of the most popular articles of furnishings. They fully realize that in order to popularize their articles it is necessary to imitate the styles of particular countries and localities. By making furniture and cabinet work in the built-up form, with the thin sheets glued together, panels of almost any size can be easily produced with ordinary lumber. If made in the usual way the widest stock would have to be employed, which is very expensive and difficult to secure. Of course giant trees of the West coast would answer, but no such timber is found in abundance in any other lumber regions. When it comes to manufacturing billiard tables and pianos the demand for veneered stock is imperative and almost constant. Even the ordinary poplar, cottonwood or gum trees can be utilized for good veneer work, and they serve such purposes as panels for cars, ferryboats and steamships. The economy of operation is not only in utilizing ordinary logs and waste material, but the panels of veneered stock can be made thinner than the solid wood and at the same time possess greater strength. A panel made of sheets laid with the grain crosswise will endure the climatic changes of an ocean voyage without warping and cracking far better than those of solid wood.



TYPE OF MACHINE WHICH TURNS LOG INTO THIN VENEER.



VENEER SLICER.

Incidentally the veneer machine has saved millions of dollars by thus utilizing by-products and small sizes of logs. Its function, however, has not by any means been exhausted. It is being utilized for new work every year. Veneered wood carpet or imitation hard wood flooring is one of the new products of this machine. The sheets of wood are glued together the same as for panels, and, with a backing of an especially prepared felt or cotton, the flooring can be rolled up and shipped as easily as carpet or oil cloth. This flooring is laid as easily as ordinary carpet. It lays flat without bulge, and when tacked down in place it retains its shape indefinitely. It is then susceptible of as high a polish as any hard wood. If properly waxed or polished its life is long. It is particularly valuable in hot countries, where vermin and insects are liable to collect in carpets and rugs.

The production of telegraph poles, milk bottles, barrels and tubs from veneered stock is a new industry that promises a good deal for the future. The telegraph poles are simply sheets of veneered stock glued together and rolled in a tubular form. In this shape they are as strong as the solid poles. Lead pencils made in this way reduce the amount of wood needed by one-half. The manufacture of wooden pails, tubs and barrels of veneered stock is an industry that marks a great advance on the past. The packages are so much lighter that they more than pay for themselves in the saving of freight. In the past barrels and tubs made in this way were used only for light articles and for dry, not wet, contents. Improvements have been made which make it possible now to ship even such commodities as nails and cement in these barrels, and the saving in freight is very large. Likewise veneered barrels and tubs treated by a new chemical method are made capable of carrying liquids. The non-absorbent character of the chemical treatment makes it possible to ship liquids around the world in these veneered barrels without waste. The extent to which the trade has gone indicates the advances which may be expected in the future.

From a stereograph copyrighted 1907 by Underwood & Underwood.

WRAPPING PAPER BEING MADE FROM WOOD PULP.

The Maine woods supply most of the butchers' skewers, match boxes, toothpicks and spools for the cotton trade. The millions of matches used in the country draw upon the Maine woods largely for their raw material. Even the sawdust of the novelty mills are utilized for making dyes and medicines. By various chemical processes the sawdust of the hard woods are converted into valuable commercial products. The balance is used for packing material and for cleaning furs. Waste is practically totally eliminated.

The manufacture of wood pulp follows closely in the wake of the novelty mills. These in fact utilize products that even the latter cannot convert into commercial articles. The waste of the lumber mill suitable for veneering, cutting into toothpicks or converting into match stems must at least have some shape and size. But the wood pulp mills can utilize all the waste, boiling the small as well as the large particles. As a result paper and pressed wood pulp articles are often made from the refuse of the woods which would have been wasted a dozen years ago. The enormous growth of the wood pulp business is due not entirely to the increased demand for white paper for printing purposes but to the invention of machinery which presses the plastic pulp into many desirable articles. These include almost anything, from culinary articles to bath tubs, car seats and interior trim.

The manufacture of artificial silk from wood pulp through treatment with caustic soda and carbon disulphide is an industry that is rapidly gaining in this country. This artificial silk is largely used for braids and trimmings, for the covering of electric wires and for mixing with natural silk and other textiles to produce brilliant effects. An estimated value of this method of converting a tree into artificial silk may be gathered from the following: "A pine tree is worth about $10; cut and stripped it is worth $15; boiled into pulp it is worth $40; bleached it is worth $55, and this turned into viscose and spun into silk is worth $5,500."

Modern processes of manufacture are thus making our forests more valuable every year, and the industries depending on them for their raw material are increasing in importance at a rapid pace. The inventor and manufacturer find a fruitful field in manipulating the products.

The invention of machinery and the discovery of new chemical methods for handling the product are agencies of the day which are achieving worldwide results.

COMMERCIAL AUTOMOBILES.

Advocates of automobiles for business offer the following points upon which the motor propelled commercial vehicle makes its claim for superiority over the horse drawn conveyance:

WOOD PULP ROLLED INTO SHEETS LIKE CLOTH.

It is considerably cheaper for transport.

It is more expeditious in delivery of goods.

It has a larger range of action.

It is a first class advertising medium.

It can work at its maximum all day and every day.

It can do more work than any horse, and a single car can replace as many as five horses. It does not require days of rest between two days' work. When not in use it requires practically no attention and no keep.

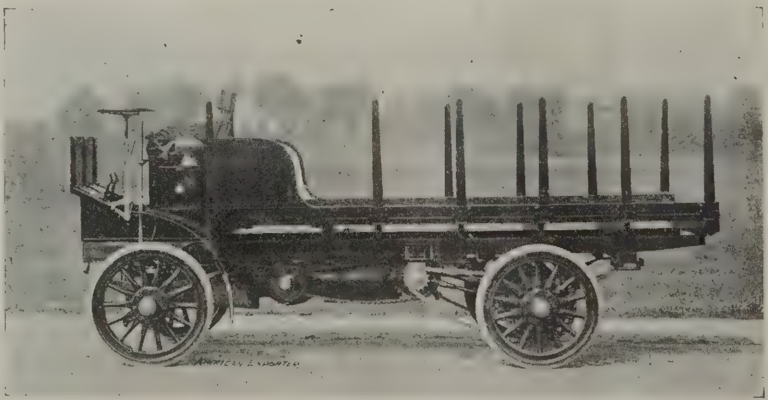
It only takes fuel when actually working, and does not eat its head off in the stables; after standing without work it is not given to being frisky, and hence dangerous to property and life. With a car work can be done at the highest pressure and no charge of cruelty to animals can be brought in.

The fuel is used to do useful work, and the cost is measured only by the amount of work.

The speed can be accelerated in case of need to at least four times that of a horse.

It does not die suddenly.

It can be manipulated with much greater ease and certainty, and in case of emergency can be stopped in a space equal to its own length, when traveling at a speed of 10 miles per hour, without exertion on the part of the driver.



AUTOMOBILE TRUCK.

Only half of the room is required in traffic; it can be manipulated more readily than any horse, and can travel safely four times the animal's speed. Thus it will be seen that if motor traffic were universal in our large cities the street obstruction problem would be solved and blockades be a thing of the past.

Less damage to the roads, since with the car the action is a rolling one and tends to smooth and level the surface instead of breaking it up as the pounding action of horses' hoofs must always do.

Less attention and stabling cost.

Less storage room and no manure heaps.

The same car that is used for business can be converted into a pleasure vehicle for evenings and Sundays.

3,000 SEE BIG LAUNCHING.

The launching at Portland, Maine, recently of the four-masted schooner Victoria was witnessed by a crowd of 3,000 spectators. The event marks a revival of shipbuilding in Portland, and work shortly will commence on another vessel similar to the Victoria. It is the first big launching there since 1890, when the Major Pickards took the water. Mrs. W. H. Reed, wife of the builder, was sponsor, and flowers were used in the christening instead of champagne. Soon after taking the water the Victoria grounded, but was easily pulled off by tugs. Important shipbuilding developments are looked for now in Portland.

GIGANTIC STEAMSHIP.

For the past three years everyone interested in shipping has been watching the express steamers building for the Cunard Line. Ever since the pioneer Britannia, with her 1,154 tons and a speed of 8½ knots, made her initial voyage in 1840, each new conception has outdone the previous one, until in the Lusitania, launched June 7, 1906, the very acme of marine architecture was reached.

The dimensions of this mammoth convey but vaguely her size—the figures are as follows: Length, 790 feet; breadth, 88 feet; depth (molded), 60 feet; gross tonnage, 32,500 tons; displacement tonnage, 45,000 tons; load draught, 37 feet 6 inches; height of funnels, 155 feet; diameter of funnels, 24 feet: height of masts, 216 feet.

At the time of her launching into the Clyde her hull was over 16,000 tons, a figure which exceeds all previous launching weights. Completed in engine, boiler and passsenger accommodation, this weight is increased almost 100 per cent., while when ready for sea, with water in her boilers, her stores aboard, and her 7,000-ton bunkers filled with coal, her weight without cargo will be approximately 45,000 tons.

LUSITANIA IN DRY DOCK, LIVERPOOL.

In the modern ship the first structural work after the keel plate is laid is the double bottom. The keel plate of the Lusitania is 5 feet wide and 3¾ inches thick, and is flush outside with the bottom of the ship. Associated with this flat keel is a vertical keel 5 feet high and 1 inch thick, and to this vertebra are attached directly or indirectly the frames and beams which make up the skeleton of the leviathan.

The double bottom is divided by the vertical keel and transverse frames into compartments in which water ballast may be carried. The tops of these tanks are carried well round the turn of the bilge, so that should the bilge keels be torn away and the hull pierced the entering water would be confined within the inner and outer bottoms. This is only one precaution in the direction of procuring unsinkability. The lower deck is made completely watertight. Below it are the lower orlop and orlop decks, and above are the main, upper, shelter, promenade, upper promenade and boat—nine decks in all. It is necessary, of course, that there should be means of communication between one watertight compartment and those contiguous, and on the Lusitania, as on board the Caronia and Carmania, these communicating doors at or below the water line are of a special type, and can be closed automatically from the navigating bridge, and that in a few seconds. In all, the Lusitania has 175 watertight compartments, so that it is claimed for her that she is as unsinkable as a ship can be.

The steel plates which cover the ribs or framing of the vessel or are used for the decks, bulkheads and casings, or in other ways, number 26,000, the largest being about 40 feet in length and weighing from 4 to 5 tons.

To secure these plates to each other and the structural framework of the ship, over 4,000,000 rivets have been used, aggregating in weight about 500 tons. The largest rivets are used in the keel plate, and these are 8 inches in length, and weigh 2¾ pounds. In fact, everything about the ship is of colossal dimensions. The main frames and beams placed end to end would extend 30 miles; the rudder, which has two sets of steering gear, one of which is below the water line, weighs 65 tons, and the diameter of the rudder stock is 26 inches. The castings for the stern, stern post, shaft bracket and rudder together weigh 280 tons.

The three anchors each weigh 10 tons, while the 1,800 feet of cable is composed of 22 inch links, the iron in which is 3¾ inches in diameter, and the weight of each link about 1½ hundredweight. Every portion of this harness has been vigorously tested, the links and shackles emerging successfully from a test strain of 370 tons.

In order to reach the great sustained speed of 25 knots the Lusitania is propelled by turbine engines of 70,000 indicated horse power driving four shafts, each of which carries one three bladed propeller of manganese bronze. The outermost shafts are each connected with a high pressure turbine, the inner shafts being rotated by the low pressure turbines.

The steamer is furnished to look as little like a ship as possible.

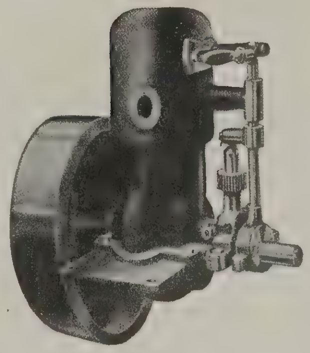
FUELS FOR MOTOR BOATS.

A Review of the More Prominent Fuels of Today—Relative Merits of Gasoline, Kerosene, Naphtha and Denatured Alcohol.

BY CHARLES M. RIPLEY.

GASOLINE.

GASOLINE can be purchased now in South America and India, while but a few years ago it was not to be obtained generally in these countries. The oil companies have taken cognizance of the ever widening demand for gasoline for use both in automobiles and in motor boats, and have established marine tank lines for transporting this well known fuel to various parts of the world. The international and increasing call for gasoline is thus being met by the activity of the oil companies.



ONE CYLINDER GASOLINE ENGINE.

KEROSENE.

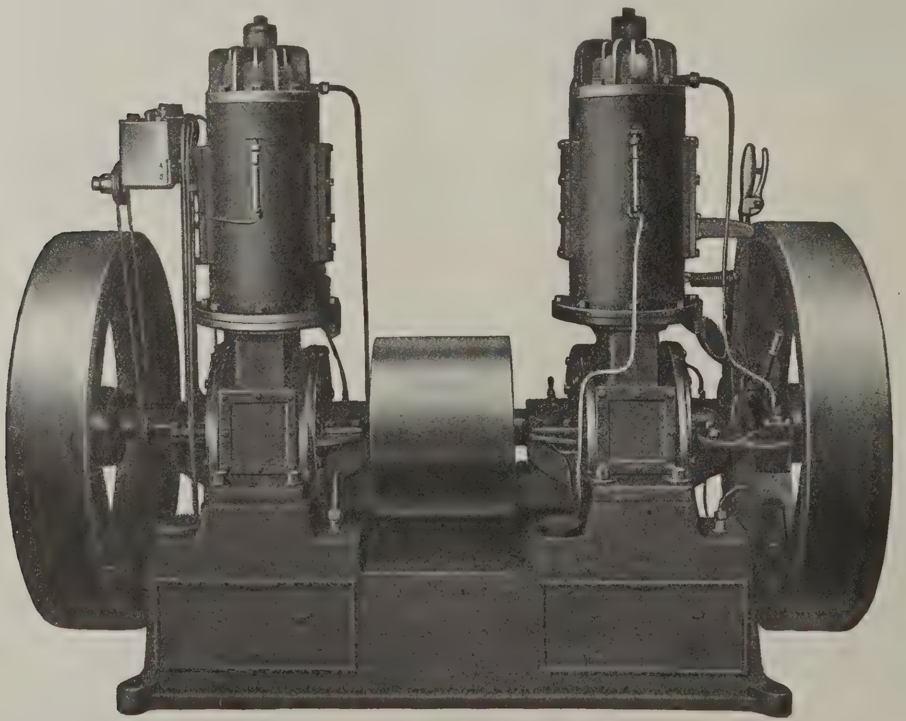
The progress of kerosene as a fuel for motor boats has been steadily on the increase. However, while the advantages exist of considerable self lubrication and the ability to obtain it anywhere easily and cheaply, there are some points that must be considered in its disfavor.

The kerosene engine will not start when perfectly cold. The tests in which this fuel has been used have been made by using gasoline at first in starting up, and then switching over by means of a threeway cock to the kerosene. Furthermore, it is to be remembered that gasoline, if spilled in the bottom of the boat, will evaporate and lose both its inflammable qualities and its odor in a short time. Kerosene, however, will soak into the wood and remain there, making the entire surface with which it comes in contact of a more inflammable nature for an indefinite time, and also continually giving forth its disagreeable odor.

It is a well known fact that kerosene will leave a deposit of carbon after combustion. This will in time foul the valves and valve seats, as well as the exhaust ports. As this "soot" increases in thickness it is likely to retain sparks, become incandescent, and cause premature explosions, the bad effect of which needs no further explanation.

A peculiar property of kerosene vapor is that under the ordinary pressure in "compression" it ignites in cases where gasoline vapor would not. Therefore in designing a kerosene motor the clearance is made such as to keep the "compression" pressure low. But it is axiomatic in motor design that the greater the "compression" in pounds per square inch, the greater will be the horse power. It follows therefore that with kerosene the horse power must be less for the same weight of engine. And if equal horse power is needed, the increase must be made in the diameter of cylinder, which leads to a greater weight—obviously a condition to be avoided.

Nevertheless it would seem that the cheapness of gasoline and its availability are destined to attract great attention to it as a fuel for motor boats. Certain it is that manufacturers have done much to make good engines for kerosene, and among a large and growing class they are highly popular.



TYPE OF KEROSENE OIL ENGINE.

NAPHTHA.

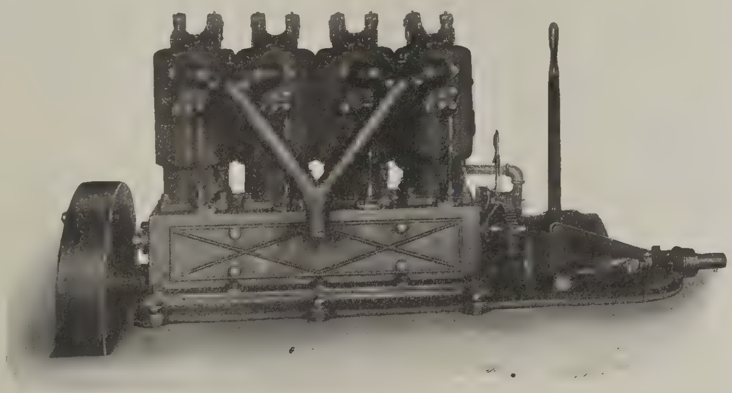
The naphtha launch has almost disappeared in the form so popular a few years ago. The naphtha was converted into a vapor in a boiler, and used expansively in the engine as if it were steam. The vapor was then condensed and returned to the boiler, part of it, however, being used as fuel under the boiler. Obviously any tiny leak in the boiler would put the entire amount of naphtha in direct contact with the flames. The frequency of accident has militated against the use of naphtha to so great an extent that one can look through the pages of a paper containing advertisements of marine engines with the following result:

Gasoline engines	11
Alcohol engines	5
Kerosene engines	4
Miscellaneous	5
Naphtha	None!

DENATURED ALCOHOL.

Denatured alcohol is that which has been rendered unfit for drinking. One of the methods of denaturing is to dilute the alcohol with a compound which upon combustion frees acetic acid. But this by-product is very destructive to the metal parts of valve seats, pistons, etc. So we have led up to the engineering definition of denatured alcohol: "That which has been rendered unfit for drinking purposes, but which has not had its value as a fuel impaired." A great deal of experimenting has been done to discover a denaturing process which:

1. Will not damage metal.
2. Will not lower the heat units per gallon.
3. Will not free by-products which will foul or clog the mechanism.



FOUR CYLINDER GASOLINE ENGINE.

Mr. Jos. Tracy, a New York consulting automobile engineer, has conducted many experiments in his laboratory in New York on different fuels. One of his most interesting undertakings was a run to Philadelphia from New York, a distance of 90 miles, with alcohol (denatured) as a fuel. Gasoline was used to start the engine, and then the alcohol was supplied. The following effects were observed:

1. Engine developed less horse power.
2. Would not start when cold owing to high vaporization point of alcohol.
3. The motors were found to be quite clean—less fouling than expected.
4. The engine ran very cool.
5. About three times as many gallons of fuel were required as would have been the case if gasoline had been used.
6. A greater per cent. of the heat units are used in alcohol than in gasoline, because the high initial pressure of gasoline means greater loss by radiation.

It may be of interest to note here that Sir Wm. Ramsay indorses a new method of extracting alcohol from peat, large beds of which are found in Canada and the northern parts of the United States. Should this be possible the cost of this alcohol would be so small as to give a great impetus to the design of motor boats for this particular fuel.

It should be mentioned here that the use of alcohol as a fuel necessitates more careful lubrication of the cylinders, for it "cuts" oils and greases, and hence the engine needs more careful watching in this particular.

Government officials are awaiting with impatience reports they expect to receive from all parts of the country as a result of their putting into effect recently the new regulations governing the use and manufacture of denatured alcohol.

Under the new conditions any farmer or set of farmers, or other individuals, can establish a still for the production of alcohol to be denatured, and can conduct it without interference from the Government, and almost without supervision. So long as the business is honestly conducted, or conducted in any such manner as to arouse no suspicion on the part of the revenue agents, there will be no governmental interference.

There will be no bonded warehouses or other obstacles or embarrassments in the way of the agriculturists who wish to turn the refuse products of their farms into alcohol.

The number of applications for permits to erect stills has within the last few weeks greatly increased, and the officers of the Revenue Bureau believe that from now on the production of alcohol for fuel, lighting and manufacturing purposes will increase rapidly.

SUMMARY.

This review of motor boat fuels would lead to the following conclusions:

1. Gasoline is still supreme, with advantages in small amount required, the ability to start cold, the small amount of fouling, the price reasonable, the supply great and the market wide.
2. Denatured alcohol useful somewhat in keeping price of gasoline within bounds, and being developed, though large quantities are needed for equal radius, and the starting is a serious problem.
3. Kerosene makes lubrication simpler, can be purchased anywhere cheaply, but it is difficult to start the engine, renders boat woodwork combustible, and fouls motor. For this latter reason, as well as for its explosive qualities under compression, it is likely to explode prematurely; also engine must be larger for equal horse power.
4. Naphtha has been almost entirely abandoned in American motor boat design.

CANADA'S MARITIME PROVINCES.

Review of the Commercial and Industrial Situation of the Canadian Provinces by the Sea.

BY W. S. FISHER,

President of the Maritime Board of Trade.

(Being a report read before the annual meeting of the Maritime Board of Trade, St. John, New Brunswick.)

BOARDS of trade have been aptly termed the business men's parliaments, and while they have no power to enact laws or to put into effect such legislation as they may consider desirable, yet their influence in creating public opinion and directing attention to matters along lines of public interest is very considerable, and is being more and more recognized.

The opportunity afforded by such a gathering to exchange ideas concerning the problems that face us all cannot fail but have a stimulating effect, not alone upon each individual present, but also upon the community in which he lives.

The list of subjects that we will be called upon to discuss covers a wide range of interesting and live topics, and is such as to demand most careful consideration before decisions are reached, in order that they may stand the test when fairly discussed by the public, in the press and before the legislative bodies to whom they will be submitted and who alone have the power to finally put them into effect.

I wish to place on record the hearty appreciation of the liberality of Messrs. Pickford & Black, who so kindly sent at their expense delegates from different sections of Canada to the West Indies for the purpose of discussing with the merchants and others there the development of trade between the two countries. That good results will follow there can be no doubt. As this subject is on the agenda, we will hear further particulars at a later stage.

Our main concern now is with the present and the future. We are here to determine what can be done by mutual co-operation to improve conditions; to find the weak spots and suggest the remedies.

The turn of the East to share in the great progress and prospects of the country, while somewhat delayed, is surely coming, and as the West fills up attention will be drawn and capital invested to a greater degree in the development of the great natural resources of the section in which we live.

It behooves us to help this along by being alert to every opportunity; to keep our case well to the front; to prevent our advantages being overlooked, and so hasten the time when through this development our population and wealth may be increased, and our young men made to realize that there exists for them in the East as good an opportunity for advancement and progress, as good a prospect for the intelligent man who is willing to put his shoulder to the wheel and work, as there is in any part of this broad Dominion.

The Governor-General is just completing his tour of the Maritime Provinces, and while here has given us many inspiring thoughts, and has referred specially to the general prosperity and absence of poverty in evidence on every side.

Among other things he drew attention to the Dutch, a people who by their patient, untiring industry have overcome tremendous natural drawbacks.

This suggests two thoughts: First, that those individuals and countries succeed best who have many difficulties to encounter, and, second, that our natural advantages are very great, greater than perhaps we realize, and that while we have many difficulties to overcome, they are small in comparison with those that have been surmounted by others in the past.

The lumber and pulp industries have been very prosperous for some years, and there is a much greater recognition of the increasing value of our forests, as well as a disposition through reforestation, protection from fires, and in many other ways to preserve and increase their value as a source of future wealth.

A new feature in this trade is the fact that a considerable quantity of spruce lumber is now being shipped to Ontario, owing to its growing scarcity in that province.

This fact is suggestive as showing the possibilities in that connection and the widening market for one of our principal products.

Fruit farming is attracting more attention each year, and there seems no reason why it should not develop enormously, situated as well as we are to cater to the export demand.

The establishment of evaporating factories now under way at different points in the apple growing districts will help this very much by providing a market on the spot for the poorer grades.

Another movement marking a distinct advance is the establishment of cold storage facilities at central shipping points, which will prove of great advantage in handling fruit, fish and other products specially.

The fishing industry, which employs many thousands of our population, is of great importance, as shown by the statement that the annual yield is valued at $14,000,000.

The coal industry of Nova Scotia has grown with great rapidity during the past few years, the output for the past season being in the vicinity of 6,000,000 tons.

In New Brunswick the past year or two has seen considerable increase in the quantity and improvement in the quality of coal produced, and it is said the prospects for future development are excellent.

Canada forming as it does a long and comparatively narrow strip of country, the question of cheap and rapid transportation is one of the utmost importance. With one complete line of railway from ocean to ocean, which with its ramifications makes a total of over 10,000 miles, and two other trunk lines in course of construction, the interior development is being well provided for.

To supplement this excellent work and to complete these claims of communication so as to make it possible to carry on the entire commerce of the country over its own rails and through its own ports with the maximum of dispatch and the minimum of expense, and also to secure that share of the all-round-the-world trade in passengers and freight that our geographical position entitles us to, no effort should be spared and no expense considered too great for the country to undertake in improving our ports and making their approaches safe and easy.

Much has been done to improve the St. Lawrence route, that most important of Canadian highways. Much still remains to be done. Something also has been done in equipping the ports of the lower provinces which afford the only entrance or exit for the Dominion for six months in the year. Much more is required.

We are deeply interested in and immensely proud of the development and prosperity of the West, and have for many years cheerfully contributed by heavy drafts upon our pockets and upon our population to its upbuilding, looking forward to the time when we would secure our share of the wonderful prosperity that its growth has brought to the whole country. As Sir Wm. Van Horne so well put the case a few years ago, when, referring to the slow development of our ports, he said: "We have enlarged the hopper and not the spout." It is not a safe thing that we should continue to be dependent to so great an extent upon the ports of a foreign country. Therefore let us urge that the cause be removed. The case is strong and the matter important.

Do the people in Ontario, Quebec and the western portions of the Dominion realize how necessary a link we are? Do they fully recognize that without the provinces-by-the-sea there would be no exit or entrance for passengers, mails or freight for six months of the year, excepting through the ports of another country? And that the tremendous development in the foreign trade that is being looked forward to with such promise would be impossible? If not fully cognizant of the importance of the Maritime Provinces to the full development of the country at large, should this not be made clear?

Before leaving the question of transportation, brief reference should be made to the All-Red Route, the practical outcome of the agitation for years for a fast mail service on the Atlantic. The great importance of this movement to the country is recognized, and the question is absorbing much attention throughout the empire, and if carried out as proposed will be fraught with great results.

Our agricultural development is not what we should expect or what the opportunities demand. We are not producing nearly enough for our own needs. We are every year bringing in from Ontario and Quebec large quantities of oats, beans, bacon, poultry, beef, onions, cheese, butter, lard, etc.; whereas we should not only be producing all we need for home consumption, but in all these lines and many more we should have a large surplus for export for which we are so admirably situated.

A glance at the list of Canadian exports or a visit during the winter to the export warehouses in St. John and Halifax will serve to show the vast quantities of these goods being exported by Ontario and Quebec.

Why is it that our farmers are so little alive to the opportunities offered them through the excellent market right at their doors, as well as to the still greater market abroad for our surplus products, which, geographically, we are in such an unequaled position to cater to?

Another reference in passing might also be made to the development in dairying that is going on in Sussex, where last year several hundred thousand dollars were paid out for milk and cream by one concern alone whose further extension is solely a matter of increased capital. A great deal more might be said to emphasize the need and the opportunities, but this is not necessary as the facts are patent to us all. It would seem that a more aggressive agricultural policy would in a large measure gradually remedy this, and by infusing more life into the farmers through agricultural societies and farmers' institutes awaken a more lively and intelligent interest in their vocation, which is the chief and most important of all and the real basis of our greatest prosperity and progress.

In the past we have been rich in men, have done our share in providing men of great breadth of thought, who have been important factors in creating, cementing and developing this Dominion. Of this same material we may feel sure the supply will not fail. For many years, unfortunately, quite too many of our young men found it necessary to seek their fortunes in the adjoining republic, and go where you will, you will find they are rendering a good account of themselves. For some time past the current has changed and those of our young men who seek other fields and what appear to them greater opportunities are finding their way to our own West. While we regret the fact that so many leave the Maritime Provinces, it is a great satisfaction to know that they are helping to build up and develop our own country.

What can we do to fill up the vacancies thus made and thus maintain a population sufficient to develop our own resources? How can we better do this than by making a greater effort to secure our share of that stream of immigrants which is flocking to our shores, seeking that freedom and opportunity which they fail to find at home? Very few of these know anything of the Maritime Provinces or of the openings that exist for them here, mainly owing to the fact that in the advertising matter issued in the past by the Federal Government little or no reference is made or information given about this section, their effort having been concentrated in exploiting the West.

Our board has been urging for years that this be remedied, and it is gratifying to note that the Dominion immigration authorities have at last awakened to the need, and at the present time have a staff collecting illustrations which it is understood will, with other necessary information, be used in the advertising matter to be distributed abroad in the future. If this is done, and the local government of the lower provinces co-operate in offering inducements and in making known what we have to offer, good results must follow.

We have not been alone among the Eastern provinces in feeling the drain and consequent scarcity of labor, owing to this outflow to the Far West, as in Ontario, also, this became so serious that some years ago the Government there, assisted by the Dominion Immigration Department, started a special colonization bureau to procure settlers who would replace those drifting westward, with the result that last year more than 30,000 over-sea emigrants were secured and are now chiefly settled in the agricultural sections of that province. This year they expect a large increase over last, and as we have as much to offer as Ontario, why should we not take a leaf out of their book?

There are many thousands among the sturdy, industrious people of northern Europe whose conditions of life are hard, and who would be glad to come to these provinces and make their home among us if the proper effort were made to show them what the opportunities are, and to give them such encouragement as they need to induce them to come, and when here to get them started on the right lines.

With raw material, such as coal, iron, lumber, etc., in abundance; with a climate in which men can work in comfort at all seasons, with an intelligent people available as operatives, with good facilities for gathering together the necessary raw materials at many points, with good local markets for many lines now imported, with excellent steamship services to the largest markets abroad, with a rapidly growing market in our own West, the opportunities for industrial development are not lacking.

At the present time more than one hundred manufacturing firms in these provinces are shipping goods to western points, and the number of these is constantly growing. Ten years ago the number of our manufacturers doing business outside the limits of the Maritime Provinces could almost be counted on one's fingers. It means effort and the expenditure of labor and capital to obtain a foothold there, but when we consider the prospect, is it not worth while?

What is the prospect? The present population of Canada is estimated at 6,000,000 in round numbers. The immigration this year will likely exceed 300,000. At all events we are safe in figuring that during the next ten years it will at least average that number, thus making a total increase during that time from immigration alone of 3,000,000 or more. Add to that as a conservative estimate the natural increase after all allowances at an average of 100,000 yearly, and we will have a total population in Canada ten years hence of not less than 10,000,000.

It is estimated that every immigrant is worth to the country not less than $1,000, which, if correct, means an increase in our natural wealth from immigration alone of $300,000,000 yearly.

Think what this vast accession to our population and wealth means in increased demand for every conceivable class of goods, especially when it is remembered that practically all this new population is made up of adult workers who require everything from the ground up. Is it not, therefore, well worth our determining to secure a share of the trade in manufactured goods that this growing market will afford?

Referring briefly to the industrial growth around us, it is only necessary to mention one or two examples of what is possible. Amherst, where we met last year, and where is seen the result of the work of a few progressive spirits, is again in the van this year in being the first section to carry into effect Edison's scheme of producing electric power at the pit mouth and transmitting it by wire direct to the factory; the Sydneys, where two of the greatest iron and steel industries in Canada have been developed in the past ten years.

To sum up, how shall we secure that measure of progress and prosperity which should be ours?

First, through the development of our rich natura resources, viz.: agriculture in all its branches, mining, lumbering, fishing.

Second, through the development of our manufacturing industries.

Third, through being on the highway of the all-the-world-round traffic, and by holding the key to the position as providing the only access from the interior to the Atlantic on Canadian territory for six months in the year.

Where in the whole of Canada or elsewhere can be found a pleasanter country in which to live, a happier and healthier people, more real comfort and fewer drawbacks than in the Maritime Provinces? As with men, so with communities; it is the strong, hopeful one that wins. Let us, therefore, strike a more hopeful note. Let us more fully realize the advantages we possess. Let us abandon any inclination toward pessimism, and with that courage born of faith and common sense co-operate in securing our share of the progress and prosperity with which this country is being so abundantly blessed.

FOREIGN AUTOMOBILE PRICES

Expert Shows How American Competition Is Lowering Prices—Few Changes in 1908 Models.

BY PIERRE A. PROAL (In An Interview)

"A SHARP reduction in the price of foreign automobiles may be looked for within a comparatively short time. The American cars, by their marked improvements within the last two years, have made serious inroads in the foreign motor business, and in order to maintain a steady and reasonable demand for their machines some of the leading European agents are already discussing the advisability of lower prices."

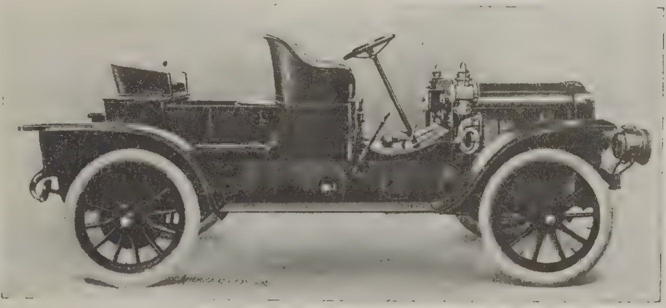
This statement, one of the first that has been made showing that a decided sentiment is arising abroad in the direction of lower prices, was expressed by Pierre A. Proal, a well-known American in the automobile field, on his return from a recent visit to the automobile centres of France.

"The foreigners are not willing to admit it openly," added Mr. Proal, "but they nevertheless recognize the fact that the best American cars are fully as good for American touring purposes as the European machine. I talked with three or four of the largest dealers in Paris, and they admitted the fact, besides acknowledging that the great improvements in the American industry had seriously curtailed their business in this country. In 1905, for instance, one of the most popular foreign builders sent 350 machines to this country. Last year the importations of the same make were but 208. I asked C. L. Charley, the French agent for the Mercedes car, what he was going to do about it, and his solution was a probable diminution of prices. It is a fact that Charley sells the new six-cylinder 1908 Mercedes car at nearly double the price it costs him from the German factory. The price in Paris is $9,500, and you will see a sample of the same car in the New York salesrooms for $14,000. With the 45 per cent. duty the American must figure on paying just twice the foreign retail price. When, on the other hand, he can get a reliable American car for $5,000 or thereabouts he doesn't see the necessity of paying another $5,000 simply for the sake of owning a foreign car if the domestic machine will give just as good satisfaction. There you have the situation in a nutshell.

"I was very much surprised," continued Mr. Proal, "at the large number of American machines I saw in Paris and its vicinity. They were so numerous as to attract general comment. The most popular types seemed to be the Packard, Peerless, Locomobile and Oldsmobile, and they had been taken abroad by their owners for touring. I failed to discover that any new agencies for American cars are being established. Some American cars are used more extensively in England than on the Continent, but American automobile agencies have not yet attained any prominence in the Continental automobile world."

Mr. Proal states that few changes will be noticed in the 1908 models of the best machines. The foreign makers are accepting the position that the touring car is nearly perfect, and more attention is now being paid to the commercial side of the industry. Mr. Proal spent a day in the big Mors factory, and saw over 100 commercial cars, big and little, nearly ready for delivery. He inspected the machinery closely, and was interested to find that all of the big lathes in the factory were of American make. These were over 600, the smaller ones being of German manufacture.

Some of the cars next season will be fitted with improved carburetors, and the six-cylinder car is steadily growing in popularity. The high-powered runabout, according to Mr. Proal, has not taken hold in Paris or throughout France. Open touring cars have also given way entirely in Paris and the suburbs to the landaulet or limousine type of body. Even for long-distance touring the landaulet type is largely preferred, as the occupants are shielded from taking the dust of every car in front, while in rainy and chilly weather it is preferable to the open car.



THE FURNITURE MAN AND HIS PANELS.

The furniture manufacturer of today is frequently filled with speculative thought about his veneer panels. Some he buys ready made up, some he makes himself, and there is always the question of which is cheaper in the end—to make his own panels or to buy them ready made from the panel manufacturer. It may safely be said, in answer to the question, that much depends on the quantity used—whether or not it is enough to make it worth while to equip a modern glue room for the work. Further than that it is difficult to give any definite answer to the question that might be applied generally. Too many other things must be taken in consideration as bearing on individual cases. There is the matter of location, of conveniences in getting veneer as compared to those of getting the panels, the extent of the investment the furniture man is prepared to make toward the raw material end, and a dozen other things, each of which has considerable bearing and may be different in each case.

There is something about it all that turns one's thoughts to lumber and the relation of the furniture man to the lumber man. In times gone by many furniture manufacturers thought it would be a good thing to have their own saw mills and timber tracts, and thus control the raw material end as well as the manufacturing part of the business. In most cases this idea was found to look better on paper than when worked out in actual practice. It cost more to get lumber by owning saw mills and timber than to buy it in the open market, and the saw mills generally were such poor investments that they were glad to get rid of them.

The next step was to purchase lumber in flitches and in boards and planks of standard dimensions, and work them up to the sizes wanted in the furniture factory. This was much better; so much so that it is not an uncommon practice today. Still, new ideas keep developing, and while it is possible to clean up waste in a furniture factory better than in many other woodworking institutions, there has steadily grown up a practice of having lots of furniture stock cut to specific dimensions at the saw mills in the woods. It facilitates drying, saves freight on waste and cull stock and offers many advantages along that line. It enables the furniture manufacturer to reduce his machinery equipment and working force, or to take the same force and turn out more work, as his business judgment may dictate. It reduces the details considerably and enables him to figure with more certainty just what his raw material will make, and what it will cost him to make it.

Getting back to the matter of veneer panels, we may apply some of this same logic and find therein an argument in favor of the furniture man buying his panels instead of undertaking to make them himself, and taking into his factory thereby a lot of detail work that is uncertain as to cost. He knows just exactly what his panels are costing when he buys them from a panel man, and is thus able to figure out just where he is all the time. It save him cost in equipment, worry over details and responsibility of results.

On the other hand there are many to whom uncertainties in which they can see promise of good results have a sort of fascination that is hard to resist. There is a natural desire, where one has the capital and ambition, to get all possible of the work in furniture making under one's own control. At times one follows this desire and makes a pronounced success. At other times it is the other way around. So every man must work it out for himself, and that without much guiding light from experience in general.—*The Woodworker.*

The following places in Manchuria have been opened to international trade: Fengwangcheng, Liaoyang, Ninguta, Hunchun, Sanksing, Hailar and Aihun.

The British colony of Ceylon and its finances are abundantly prosperous. Rubber and other industries are badly hampered by the want of railways, roads and bridges.

LOOSE LEAF BOOKKEEPING SYSTEMS.

How Conservatism in Accounting Is Yielding to Modern Methods.

BY F. W. RISQUE.

EVERY civilized country is studying the methods by which the United States is enabled to handle its varied and ever increasing volume of business.

I speak advisedly on this point, and remind you that many meetings and conferences have recently been held in Europe by heads of houses, of chambers of commerce and guilds, at which frank and full discussion was invited and committees appointed to report especially on such subjects as advertising, window dressing, selling methods and loose leaf accounting, as is now in vogue in America.

Judicious publicity is necessary for continuous increase in business, but if the machinery to economically handle this increase is not provided, confusion then ensues and embarrassment is the result.

The American is wont to pride himself upon his practical use of the best, his short cuts and elimination of non-essentials, that he may secure the wished for results with the least delay, labor or worry.

Hence the great development in accounting, notably by adopting or using loose leaf books and auxiliary office devices within the past few years.

If any one of our large houses should attempt to return to the methods of fifteen or twenty years ago, its present force of employees would have to be more than doubled.

We know personally that many have scouted at using an adding machine. We also know that they have a thousand and one objections when loose leaf books are mentioned. We also know that they need, and before a great while will be using, all these modern tools.

As soon as the public appreciates the convenience and advantages of such methods a revision of existing routine will follow.

A very large manufacturing stationer from England stated a short time ago that personally he was disposed to invest largely in modern equipments and supplies, but as a business man he must reckon with the British public, which is very slow to change existing forms or customs, and he knew it too well to anticipate large sales of such goods.

To make his point clear he said as example:

"If I visited one of your factories and inquired of an operator, 'What speed does your machine make?' he might reply, 'The pulley has now 1,200 revolutions, but I hope for greater results, and that we can soon get it up to 1,500, and before long to 2,000, where it should be.' Now contrast my man. You visit one of my factories, and ask one of my men about the speed or efficiency of his machine, he most likely will say, 'She is making 1,200 revolutions, sir, but I hope I can persuade the boss to drop to 1,000 within the next three months, and later on to 800, the proper limit for safety and efficiency.' "

Hence this traveled business man, who appreciates modern ideas to the extent of using them himself, is so justly conservative that he will await the time when his patrons may be educated to their uses before he will lay in a stock of modern office appliances.

The loose leaf idea is no mystery. It may be very simply explained. If you could take your bound books now in use, cut off the backs, cull out or remove the dead matter which could be arranged and filed in a logical manner for quick reference, arrange alphabetically or otherwise, and place the live accounts or matter in a binder for current use, you would enjoy the full benefits of modern loose leaf.

If your present system of bound books suits you, simply order the same forms or sheets prepared, unbound. Secure the proper or suitable binders and your system may be ideal.

You may need some explanation as to size, binding, margin, kind, class or character of cover or fastening, but by all means get the simplest and best you can afford. There are ledger covers which are simple to operate, open flat, are expansible, etc. There are sectional post or transfer binders, which should be constructed for speedy operation, have a large capacity and are of neat appearance.

There are files for papers, tariffs, prices, etc.; order and letter holders innumerable, good, bad and indifferent; there are prong and ring books of almost any standard size, capacity or style of binding.

Experience has demonstrated and clearly outlined the devices for the principal branches of office work. When the intelligent clerk has used them awhile he may see new uses and how he might combine one or more blanks, and find such development of great value for time and labor saving in his particular everyday work.

The three Canadian provinces of Manitoba, Saskatchewan and Alberta, commonly known as the Canadian Northwest, have progressed as follows:

	1881.	1906.
Population	105,681	808,863
Acres in grains	56,971	7,915,611
Production, bushels	2,785,597	240,459,068
Farms in 1891	54,625	120,439

PAN-AMERICAN BUREAU.

Handsome New Headquarters for Western Nations at Washington.

REAR VIEW OF THE NEW PAN-AMERICAN BUREAU.

GROUND will be broken in a short time for the new building of the International Bureau of American Republics at Washington, which will be unique, not only in Washington but in all the world. It will serve as the international headquarters or offices in one national capital of twenty-one different American nations. The nearest approach to it will be the new Temple of Peace now being erected at The Hague. The cost of this Pan-American structure, when it is fully completed and ready for occupancy, will be nearly $1,000,000, of which Andrew Carnegie generously contributed $750,000 and the different American nations approximately $250,000.

The revised drawings of the architects here shown have just been approved, after having been originally selected from the largest architectural competition in the history of Washington, in which 130 leading North American architects entered. The winners in this contest were Albert Kelsey and Paul P. Cret, associate architects, of Philadelphia.

This imposing international building will stand on one of the most attractive and commanding sites of ground in the national capital, commonly known as the Van Ness Tract, which covers 5 acres, facing the Presidential grounds, or White Lot, on the east, and Potomac Park on the south, at Seventeenth and B streets. This site is only two blocks below the Corcoran Art Gallery, next to the new building of the Daughters of the American Revolution and near the Washington Monument.

The dimensions of the building will be approximately 160 by 160 feet, or 52 by 52 metres. The main portion will stand two stories above a high studded basement, and will in turn be surmounted by dignified balustrades. The rear portion, in order to cover the capacious Assembly Hall, will rise still higher. It will be constructed throughout of steel and concrete, with the effect of a Spanish stucco finish and with white marble steps, foundations and trimmings. The roofs will be of colored Spanish tile, and the interior exposed portions will be decorated with polychrome terra cotta.

The general architecture will suggest Latin-American treatment out of respect to the fact that twenty of the twenty-one American republics are of Latin origin, but it will possess such monumental characteristics as will make it harmonize with the adopted scheme for the beautification of the national capital.

Its most notable features of construction, aside from numerous well lighted rooms for the regular work and staff of the bureau, will be a capacious, typical Spanish patio, over 50 feet square, in the front section, covered by a glass roof that can be opened in summer and closed in winter, thus providing protection against the weather for constantly running fountains and continually growing tropical plants; a large reading room, 100 by 60 feet, where can be seen all the South American as well as North American publications, and where books can be consulted from the Columbus Memorial Library, which has the best collection in the United States of works on the American republics, and a dignified assembly chamber, 100 by 70 feet, that, for present purposes, may be called the "Hall of American Ambassadors," which will provide the only room of its kind in the United States specially designed for international conventions, receptions to distinguished foreigners, and for diplomatic and social affairs of kindred nature.

Other important divisions of space will include a handsome room for the governing board of the bureau, four committee rooms suited for diplomatic conferences, a stack room for the library that will hold 250,000 volumes, large offices for the director and the secretary of the bureau, with their assistants, including editors, statisticians, translators, librarians, accountants, clerks and stenographers. Much of the decorative finishings of the interior will be in rare woods from the South American forests, contributed by the different countries that support the bureau, while the walls of the principal rooms will be decorated with paintings, pictures, statuary, etc., suggestive of Pan-American history, development and progress. At the main entrance of the structure will be two heroic marble figures symbolizing respectively North and South America.

The bureau is strictly an international and independent organization, subordinate to no department of the United States Government, and maintained by the joint contributions, based on population, of the twenty-one American governments. Its practical use is demonstrated y the fact that during the last six months it has developed business that has added at least $15,000,000 to he value of Pan-American foreign commerce. Its present object, in short, is not only to advance commerce and rade, but to strengthen comity and friendship among all he republics of the Western Hemisphere.

FRONT VIEW OF THE NEW PAN-AMERICAN BUILDING.

HISTORY OF THE UMBRELLA.

With the seasons upside down as they are at present, eople are beginning to realize the absolute necessity of ever stirring out of doors without an umbrella. If ocial history is to be trusted, the first Englishman to arry an umbrella was one Hanway, who lived at the nd of the eighteenth century. At first he was regarded s an eccentric individual, but by degrees many discovered much method in his madness, and before he died, n 1786, the fashion he set was adopted by society in eneral. Of course, Hanway was not the originator of he umbrella. Among the Greeks and Romans some uch article was very common, though oddly enough it vas regarded as a purely feminine appanage, and one vhich men might never condescend to adopt. But all ver the East the umbrella has for generations been well nown as an insignia of power and royalty. Thus, on the sculptured remains of Egyptian temples one sees representations of kings going in procession with umbrellas carried over their heads. Even in India today some of the great maharajahs still call themselves "Lords of the Umbrella," and in an address presented by the King of Burmah to the Viceroy of India in 1855 the British representative is described as the "monarch who reigns over the great umbrella wearing chiefs of the East." One has only to walk through the streets of any Indian town today to see how important a social distinction the umbrella has become. For a native to go without an umbrella in the streets of Calcutta, for instance, is practically a mark of degradation.

SHUTDOWN THREATENED IN AMALGAMATED MINES.

The fact that there is a possibility of the mines of the Amalgamated Copper Company shutting down at Butte within another thirty days, unless the demand for copper picks up in the meantime, was fully established by a statement made by a representative of that company, although it was asserted no orders as yet had been issued from the New York office which would result in the shutdown.

The Amalgamated Company is, of course, disturbed by the conditions that prevail in the copper market, the directors naturally preparing to take such action as will be in keeping with good business judgment.

DR. HADLEY GOING TO BERLIN.

Dr. Arthur T. Hadley, of Yale, will sail on October 8 and will go directly to Berlin, remaining in that city until early in March.

While in Berlin he will deliver a course of public lectures on "The Industrial Organizations in the United States," and will conduct special classes in American industrial history in the Berlin University.

His lectures are a part of a system of interchange between American and German universities.

WITH THE MANUFACTURERS.

Industrial Notes of Interest—Descriptions of Products Which Find a Ready Market Abroad.

FRAMED PICTURES.

The successful manufacturer of picture frames and framed pictures must be something more than a business man. To the requisites of the careful and enterprising business man must be added the artistic feeling and appreciation of the connoisseur and a keen knowledge of humanity and of popular taste. It has been the possession of these varied attributes which has placed the firm of Nathan H. Hirshberg & Sons, of Baltimore, in the commanding position which it now holds in the framed picture trade.

Not only do the businesslike methods of this firm appeal to the buyer, but the artistic judgment shown in its line attracts and holds confidence and esteem. Especially rapid has been the growth of the export trade of this company.

"When we first went after foreign trade," said Mr. Hirshberg to an American Exporter representative recently, "we were disappointed in the small orders which we received. Most of them were so small, in fact, that they did not pay for the expense and trouble of packing. But we had faith in our goods and in the foreign market, and we packed a small order as carefully as possible. The result has been that those first orders proved to be sample orders, and were followed by orders for thousand lots, and we are now exporting an enormous number of framed pictures, pastels and water colors, mirrors, cheval glasses and novelties. When we first began exporting, certain New York export commission men declined to handle the account on the score that it was too small. Now over one hundred of these firms are handling our account."

STANDARD WASHING MACHINE.

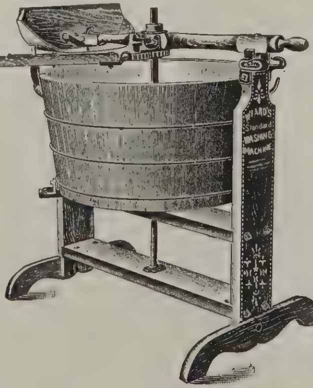


FIG. 1.

The Wiard Manufacturing Company, East Avon, N. Y., U. S. A., is the manufacturer of Wiard's Standard Washing Machine, of which illustrations are shown. This machine has a double rotary motion, and is claimed to be entirely different from any other washing machine on the market, from the fact that the tub is moved in one direction and the upper disk in the opposite by means of a gearing. The bearings are all machine-bored and reamed, and the tub is made from selected white pine and finished in the natural wood, having electric-welded wire hoops. The frame is made from hard maple, and also finished in the natural wood. The castings are galvanized throughout, and a very neat appearing washer is made by this combination.

This machine has the idea of separation—the frame, the tub and the yoke. It avoids the necessity, so common in other washers, of moving the machine bodily in one piece, which requires more strength than is possessed by the average woman. The tub, being detached from the frame, can be stored separately, while the frame and yoke can be put away in any convenient place.

Neither of the series of ribs rubs over the clothes, but engages the clothes and carries them back and forth, and as these disks rotate in opposite directions the clothes are given a wringing, twisting motion, which, with the aid of the compartments formed by each series of ribs, forces streams of water in and through the garments, thus cleansing the contents of the tub in a very short time. The arm rises for the purpose of putting in or removing the clothes. Particular attention is called to the position of the wringer, which does not have to be removed from start to finish. The drip from the wringer is carried back into the tub by means of a metal spout, the edge of which is folded over. There is no perceptible wear on the clothes. The easier the washer works the greater the circulation of hot air and soap suds, and hence the faster it washes. It has no springs, cams, trips or other complications, and is consequently extremely simple in construction.

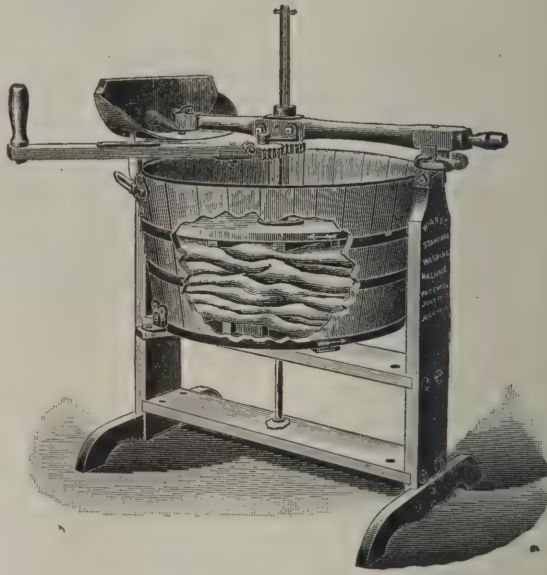


FIG. 2.

Fig. 2 shows the washer closed down and ready for use. Its operation consists in moving the horizontal hand lever back and forth. No need to bend over. No washer on the market can be operated sitting down to better advantage than the Standard. The little arrows on the engraving show the direction of the disks as they are rotated. All other washers have a single motion only. When the tub rotates the upper disk is stationary, and when the uper disk rotates the tub is stationary. In the Standard Washer both rotate at the same time, but in opposite directions.

MOTOR MANUFACTURING AND TESTING.

The home of an automobile is almost, if not quite, as interesting to the devotees of the sport and to the trade as is the finished machine itself. The rapid growth in popularity, both at home and abroad, of some American cars has afforded opportunity, indeed has created the necessity, for the construction of factory buildings that are models in equipment, arrangement and facilities of all that a twentieth century factory may be and ought to be. In illustration of modern establishments in the United States devoted to this industry the Olds Motor Works at Lansing, Mich., may be cited as one of those ranking among the largest and best equipped in the country. This plant comprises sixteen buildings, exclusive of the testing room, and covers an area of 65 acres. The covered floor space amounts to 305,000 square feet, and over 1,000 men are at present employed. The most modern methods of construction have been employed, and very special attention devoted to systems of lighting, heating, ventilating and protecting against fire.

All castings for the Oldsmobile are made in their own foundry, and a blacksmith shop is maintained where all steel and wrought iron forgings are shaped. All parts are subjected to a very rigid examination, and are carefully marked and stored away so that when they are finally used in the assembly room each part goes to its correct place according to the marking thereon.

There is a great advantage gained by their large plant over a small one in time and labor in machine work, as hundreds of parts of each kind are machined up at one time, this being a great advantage also to the man who may wish any part of his car replaced, as it is always readily obtainable and at a much smaller cost than if it had to be made to order, as is the case in small plants.

THE "MUDLARK."

The motors, before being placed in the frames, are put through severe tests, and are kept in the testing room for several days, being run at least fifteen hours at a time without stopping and being carefully adjusted.

The first Oldsmobiles to become famous were the curved dash runabouts, which have traversed every part of the globe and established some phenomenal records. Four cars, the Model "A" Palace Touring car and Limousine; the Model "H," the Flying Roadster Runabout and the familiar Oldsmobile Runabout, represent this year's line. The first three of these machines are equipped with a four cylinder, 35-40 horse power water cooled motor, selective sliding gear transmission and bevel gear drive. The weight is much reduced by the frequent use of aluminum in the construction.

In the last two years a number of so-called non-stop runs have been inaugurated to show the efficiency of the cars. During each of these tests the engines were kept running continually for a stipulated time.

The first run of this kind was made in Chicago, Ill., and started at 8 o'clock on March 29, 1906. At 12 o'clock on April 2 1,115 miles in all had been run, and this without the engine stopping for the 100 hours. A 200 hour non-stop run was successfully completed in Detroit, Mich., on April 26, 1906, a total of 3,000 miles having been covered during this time.

In Cincinnati, Ohio, a 100 hour non-stop run was completed on June 1, 1906, this time covering a distance of 1,127 miles, a great deal of the distance having been made over hilly roads.

The Oldsmobile Company accomplished one of the hardest feats in the list of automobile tests when they ran one of the big four cylinder cars from New York City to Poughkeepsie, N. Y., a distance of about 75 miles, with the gear lever sealed into the high speed notch. This test was run on May 19, 1906, and in order that all observations be absolutely correct and officially recorded a proposition was submitted to the members of the contest and technical committee of the New York Motor Club, asking for their official sanction and co-operation, which request was granted. The car used was a four cylinder Palace Touring car of the water cooled type, sliding gear transmission, with a selective control. Under the conditions the control lever was thrown into high speed position and sealed, making it necessary to start and operate the machine entirely on the high gear, even in reversing. When the plan was first broached in New York its promoters were the laughing stock of the majority of the automobile people there, but nevertheless the plan was carried out and a record for hill climbing was established which has never been broken by any other car, no matter how large and powerful, and considering what was accomplished is a record which will probably stand for some time to come.

At the Open Air Show at the Empire Track, New York City, on May 24, 1906, the Oldsmobile Palace Touring car won two tests, which went far to show its superiority over the other cars entered, all cars entered claiming 40 miles an hour or better. The first was the brake test. In this test each car received a half mile start, traveled a marked one-eighth of a mile in less than 11 2-5 seconds, when the brakes were applied on signal and the minimum distance required for stopping measured. An observer was carried in each car. The Oldsmobile went the one-eighth of a mile in 10 seconds and stopped within 68 feet.

The second test was the vibration test, in which a pail of water, brimming full, was carried on the tonneau floor for 200 yards from a standing start, the Oldsmobile spilling only three-eighths of an inch on the way.

On December 23, 1906, a four cylinder Oldsmobile Touring car left New York City carrying four people, and started for Ormond Beach, Fla. The distance is 1,400 miles, and was made in eighteen days. Probably at no time nor place could a car go through worse roads and behave more creditably than did this Oldsmobile on this run. They traveled over mountains, through rivers and mud which at times threatened to bury the car, but the engine never failed for a minute, and at the end of the run was in perfect condition, as was proven by the winning of first place in the two events in which the car was entered. This car was christened the "Mudlark," owing to its wonderful performances, and is known as such throughout the entire country.

A recent court decision at London, Ont., rendered in favor of the Ideal Concrete Machinery Company, of South Bend, Ind., leaves this concern in practical control of the manufacture and sale of face-down, horizontal core concrete block machinery. The patent, the validity of which is now firmly established, was acquired from the original inventors, Messrs. Borst and Croscop, by the above company, and it thoroughly covers the process of manufacture of face-down concrete building blocks.

This concern is now making arrangements to greatly enlarge its plant at South Bend, Ind., and is also opening a large plant at London, Ont., for the manufacture of "Ideal" concrete machines for the Canadian trade.

BARBER CHAIRS AND FURNITURE.

The Louis Hanson Company, of Chicago, Ill., leading manufacturer of barber chairs and furniture in the United States, has on the market at the present time a complete line of barber chairs which it is now exporting in large quantities to all parts of the world. The business was established in 1868. Twice since then the company has doubled its capacity, and business has been increasing to such an extent that it anticipates erecting a new plant covering about 15 acres, besides extra space required for lumber yard and other purposes. The export department has the facilities to take care of all correspondence and other business connected with that department very promptly, and a special point is made of shipping goods expeditiously and with the best of packing.

The company manufactures the hand lever and foot lever hydraulic chairs, an all iron chair with both hand lever and foot lever mechanism, pedestal and leg chairs. The mechanism of these chairs, especially the hydraulic ones, is simplified to such an extent that the chairs are operated with the utmost ease, and cannot get out of order through ordinary usage.

Its excellent facilities enable the company to execute all orders promptly, having a complete stock on hand all the time. The company congratulates itself upon its good success and few complaints have been received regarding packing of the goods, which is done so well that it is almost impossible for any breakage to occur in transportation, which is quite a factor in exporting.

The company is establishing exclusive agencies wherever is found a market for its goods, and offers a most attractive exclusive agency proposition.

Catalogues and prices will be gladly mailed upon inquiry, and any other information desired will be given cheerfully.

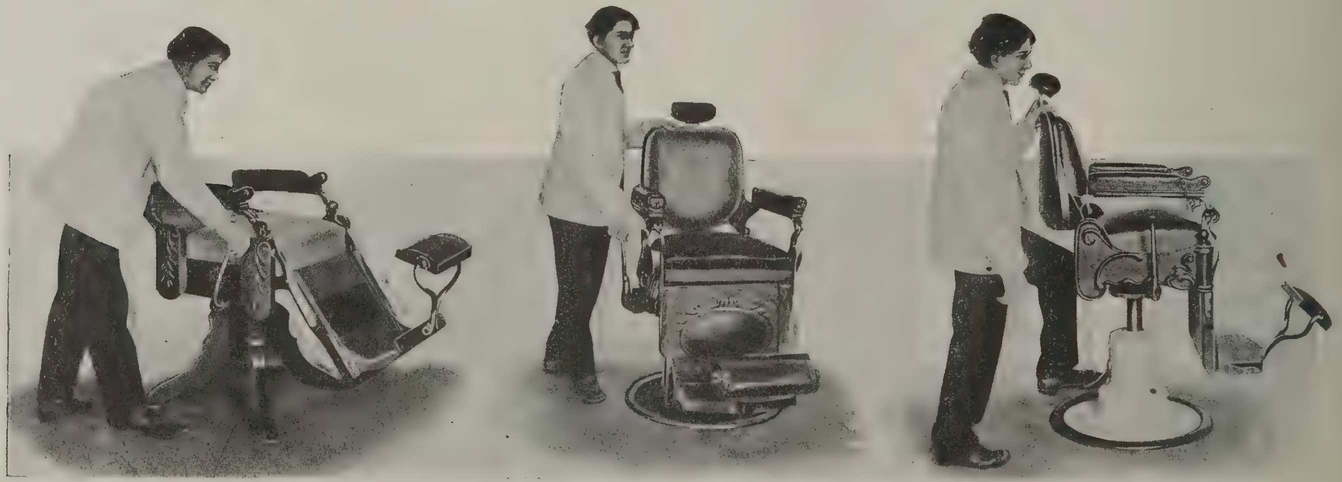
The Hanson Company also manufactures a complete line of hall furniture and mirrors, which is listed in a separate catalogue.

LOZIER 1908 MODELS.

In view of the fact that motor car manufacturers' 1908 announcements indicate in a general way that there will be but few changes in next season's cars, the announcement and description of an entirely new Lozier model for next season will undoubtedly attract interest, as it is a car full of original and surprising details. The Lozier announcement is doubly interesting because of the increasing prominence of this make of car and the record which it has made in the past year on road and track, for the car is now conceded a place among the recognized leaders, and the mechanical principles involved will receive favorable consideration.

The foresight of The Lozier Motor Company, which induced it, three years ago, to adopt for its motor car large wheels, long wheel base, double ignition system, annular ball bearings, and other features which have since become general up-to-date standards, has made it necessary to make but very few changes in their car from year to year, resulting in an advantage to the purchaser, who is not obliged to change his model repeatedly to keep up to date. At certain periods, however, cumulative experience teaches wherein design and constructive practices may be improved upon, and the year 1908 brings forth, therefore, a Lozier motor car which is entirely new and different in every detail from its predecessor, the only feature of the new car bearing any resemblance to the former models being the cooler. The new car embodies modern and up-to-date features of such a nature that the buyer of one of these cars will probably find little occasion to make any change for several years to come.

One innovation in the new car is the adoption of the shaft-drive principle, although chain-driven models will still form a part of the Lozier line. The Lozier Motor Company, however, has gone upon record as believing in the utility of the Cardan shaft—a form of construction only recently made practical through improvements in this form of final drive and the materials entering into its construction.

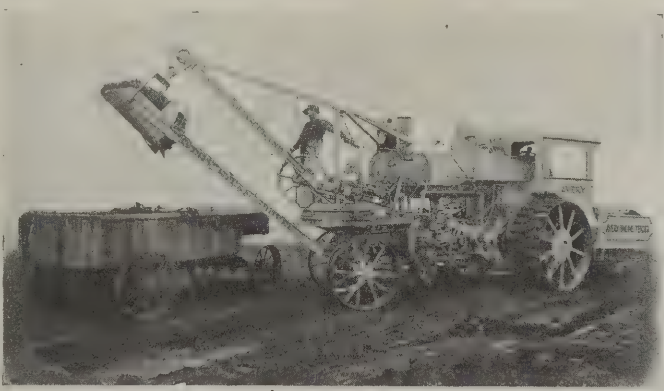


THREE TYPES OF THE HANSON BARBER CHAIR.

NEW TRACTION ENGINE.

Many experiments have been made in the past few years looking toward the use of traction engines for hauling lumber, ore, road graders, etc., and these experiments have, in the main, proven so satisfactory that the demand for engines for such purposes has largely increased. It has been proven that a saving of from 25 to 50 per cent. of the cost of hauling could be effected by the use of steam engines in place of horses, and, in fact, in many cases where mining and lumbering operations could not be carried on at all, on account of the large expense of transporting the product, the use of steam traction engines has so decreased the cost of transporting that these mines and lumber mills could be operated at a good profit.

When considering the purchase of a traction engine for such purposes there are several points which one should keep in mind. Perhaps the four main requisites of a traction engine for such purposes are durability, power, ease of handling and speed. All traction engines possess these features to a certain extent, but some are much more efficient than others, and attention is called particularly to the new Avery undermounted double cylinder locomotive traction engine. This engine is a new type, built entirely upon new principles, and repeated tests have shown that for very many purposes it possesses points of superiority over the old style engines where the cylinders are mounted on the top of the boiler.



TRACTION ENGINE, WITH STEAM SHOVEL ATTACHMENT.

The question of durability is one which purchasers of engines will consider very strongly, and is one in which the Avery undermounted engine especially excels. With the old top-mounted engine the boiler is the real frame of the engine, the cylinders and gearing being all attached to the boiler by means of brackets. All the strains incident to heavy hauling come on the boiler, which soon shows the effect of the steady pulling in leaky bolts and loose brackets, and the life of such an engine for continuous hauling purposes is very short. The real facts in the matter are that while the demand for traction engines for hauling purposes has grown up and has been brought to the attention of all traction engine manufacturers, practically all of them have failed to appreciate how greatly different the demands are on an engine which is to be used for continuous hauling purposes than they are on a threshing engine, a large part of whose power is to be expended in belt work for driving the separator instead of in traction work. Other manufacturers have attempted to meet this demand by simply reinforcing their gearing and building larger engines, but in doing so they have not in any way avoided the real difficulty—that of relieving the boiler from the great strains incident to hauling heavy loads. The Avery Manufacturing Company, however, in considering the problem, and having for many years built one of the best top-mounted engines on the market, saw that the demands on an engine for hauling purposes were entirely different from those on an engine which was to be used for threshing, and fully realizing that no top-mounted threshing engine could successfully meet these requirements they devised the new Avery undermounted double cylinder engine. In this engine the cylinders and gearing are mounted on an independent steel framework, and the boiler is entirely relieved of all strains. All that is required of it is simply to generate steam, which it is easily seen should be the only thing required of the boiler if one contemplates its having a long life. In this engine all the strains come on the steel frame, and the durability of the engine is thus largely increased.

In the second place, on account of the engine being undermounted, the power developed by the cylinders is transmitted through the gearing and applied to the pull on the load in a direct line, instead of pulling down from the top of the boiler at an angle of from 45 to 90 degrees, as with top-mounted engines. The great advantages of this form of construction can be better appreciated by a reference to practical tests than by a theoretical discussion of the value of a direct pull over one at an angle, although it is probable that there will be no one but what, if the question were asked them whether they would rather pull the load in a direct line or at an angle, would at once choose the direct pull. Repeated tests, however, which can be thoroughly relied upon, have proven that one of these undermounted engines has a pulling capacity of at least from 15 to 25 per cent. more than any other engine of equal rated horse power. The amount of power which a certain sized engine can develop is one of the most important questions which contractors, lumbermen and miners will consider, and it is certain that an Avery undermounted engine will appeal to them very strongly in this respect.

When it comes to ease of handling, it will be noticed that all of the engine parts are low down, and can be oiled or any adjustment can be made by the operator while standing on the ground. This is unquestionably much more convenient than climbing around over a hot boiler. When it comes to guiding, the engine is equipped with a new style screw shaft guide which eliminates all the slackness of the old style chain guide, and relieves the operator of a great deal of unnecessary work. For instance, on mountain roads, where the track is very narrow, there is no jiggling from side to side, and this fact is also greatly appreciated in grading work where it is necessary to run close to the edge of an embankment. The positive screw shaft enables the operator to guide the engine with very little turning of the wheel and with very little effort on his part. When specially ordered, the engine can also be equipped with a steam guide, which consists of a set of double cylinder engines with 4x4 stroke and bore, and a clever valve gear and bell crank connection to the collar and sleeve on the shaft running to the steering wheel in the cab. The engineer guides the engine by turning the wheel in the usual way, but has to exert no power whatever beyond turning the idle wheel, for the small double cylinders supply the power, the engineer simply turning the wheel to the right or left, depending upon the direction in which he wishes to go. When he quits turning the wheel the engine shuts itself off and the steering apparatus remains in that position until a change is desired. Experiments along the line of building a satisfactory steam guide have been conducted for many years, and this one meets the requirements perfectly.

The question of making short turns easily often comes up when considering the use of traction engines for hauling, and in this connection it is interesting to note a recent letter received by the manufacturers from one of their customers in Colorado, who states that he is hauling four loads of lumber, besides the water tank, around curves 75 feet in diameter, and if necessary he could haul one more wagon. The owner of the engine also says that when they first began hauling lumber people laughed at them, and said they could not get around the curves with more than two wagons; but those who doubted have changed their minds and the owner of the engine is saving 50 per cent. in cost of hauling.

In the matter of speed the Avery undermounted engine is equipped with a double speed gear, one for heavy hauling, which corresponds to the ordinary speed or walk of a team of good, lively horses—say, 2½ to 3 miles per hour—while the other speed ranges from 3½ to 4 miles per hour, according to the way the engine is driven.

The manufacturers have designed several splendid attachments for this engine, consisting of a new steam shovel and derrick, a new style engine tender, heavy steel axle wagons for hauling purposes, steam plow, etc.

The steam shovel is capable of handling from 1 to 5 yards of dirt per minute, according to the condition of the ground where the excavating is being done. It can also be used for loading ore, sand and gravel into wagons or cars. By removing the shovel the lifting crane can be used for unloading heavy material from flat cars or loading it on, and for many other purposes of a similar nature. Heavy articles may be picked up and transported from one place to another, and where a large amount of this work is being done continually one of these machines is a great money and time saver. The general design and make-up of the Avery undermounted engine is admirably adapted for the use of such attachments, while the ordinary traction engine could not be well used for these purposes.

The tender is a new style, much stronger than the usual engine tender, and is carried by an 18-inch faced wheel, and is so attached to the engine and guided in such a way that it is always directly behind the engine, whether moving forward or backing up. It has a water capacity of 1 ton and over. This tender cannot be compared with the cheap, wooden barrel tenders, which are too light of construction and of too small capacity to be satisfactorily used for such purposes.

SHOWING DERRICK ATTACHMENT.

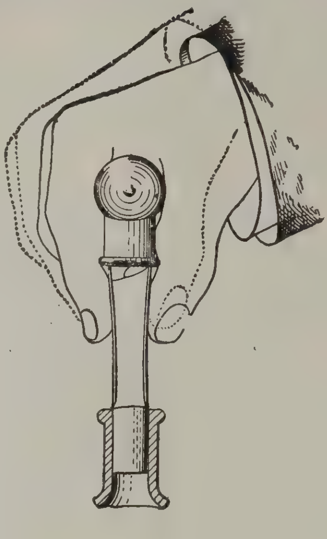
The Avery Company also builds heavy steel axle wagons of 10 and 15 tons capacity, which can be furnished either with or without platforms, and are built especially for coupling on behind the traction engine in hauling lumber, dirt, gravel, sand, ore, etc.

The demand for traction engines for freighting and grading purposes of all kinds is largely increasing, and the Avery Company seems to have anticipated this demand in a thorough manner.

CORK PULLER.

The "Quick as a Wink" Cork Puller, made by C. D. Hawley, New York City, is a novel article, of which great numbers are sold abroad each year. With this appliance one does not pull as with the ordinary corkscrew, but turns the puller and draws it gently, whereupon the cork rides up and out. The puller is also used to recork a bottle.

Among the claims made for this instrument are these: It is easier than a corkscrew, as there is no unscrewing of the cork after pulling, as it drops from the puller; it is surer, as no matter how old or poor the cork is it comes out whole; it is safer, as there is no danger of spilling or shaking up contents of bottle; it cannot push the cork into the bottle, but pulls it out every time; it's a "corker," as it will cork as well as uncork; it makes no hole in the cork; it draws large corks and smaller vial corks equally well, answering a better purpose than three different sizes of corkscrews, because it leaves the cork good to use again. With a shield it can be carried in the pocket as easily as a jack knife. With this puller one is prepared for any emergency, and can keep all bottles and vials of medicine and others tightly corked and open them instantly any number of times, using the same cork.



SUCCESSFUL FURNITURE EXPORTERS.

The Karges Furniture Company, of Evansville, Ind., takes a pardonable pride in the export reputation which it has established. This firm has shown a desire to cater to the foreign trade with foresight and with the aim of meeting the wishes of the foreign buyer as regards styles, prices, packing and terms. It is said that it has never received a complaint from a foreign buyer, a very significant statement, as business dealings between parties at a great distance from each other are almost bound at times to give rise to some slight misunderstanding.

The Karges Furniture Company makes a specialty of tables, chiffoniers, chifforobes, bedroom suites, wardrobes, dressers and washstands, and makes a line which includes both high priced and low priced goods. The factory is one of the largest and best equipped in Evansivlle, a leading furniture making center, and the company reports at the present time a very large export demand.

KEYS-CHURCH CONSOLIDATION.

The firms of Charles H. Keys and the Church Cooperage Company will hereafter be identified in the Keys-Church Company, Inc. In bringing together the two oldest established cooperage stock houses in the world a new company has been formed, which starts out with not only the weight of years behind it but with enlarged capacity and advanced methods backed by enterprise, industry and capital. While being much wider in scope, it will embody the individuality of each of the old firms and be conducted in the same forceful yet conservative manner which has so appealed to their patrons. The aim of the Keys-Church Company, in short, is to live up to the high ideals and fine integrity that have characterized its predecessors.

NEW PLATING DYNAMO.

For gold, silver, nickel and copper plating the W. Green Electric Company, New York, has just placed on the market its 1907 plating dynamos. These dynamos are compound wound, have phosphor bronze bearing sleeves, self-oiling bearings and extra large commutators and brushes.

PAGE HIGH CARBON WIRE VERSUS HARD DRAWN WIRE.

While people generally now understand the great superiority of high carbon wire over the hard drawn article, called by those fence people using it hard steel spring wire, there are no doubt still a few people in whose mind the distinction is not quite clear.

High carbon wire is made of steel having a high percentage of carbon in it. It is carbon that gives steel the nature that will enable it to take a temper. The steel in Page wire is what is known as 30 point carbon, as compared with 6 to 10 point in "hard steel" wire.

"Hard steel" wire, while as "hard" as the high carbon—it is a "dead" hardness—has little strength and spring, and will not take temper. Anyone can determine for himself whether certain wire is high carbon or not. Heat a piece of the wire red hot and while red plunge into water till cold. If high carbon it will then be tempered so hard it will break like glass, because it has a temper like a steel needle. If hard steel wire it will be practically the same as before—no temper, because it is a low grade of steel.

The Page Wire Fence Company, of Walkerville, Canada, use a high carbon steel wire in their fences, and state that their fences are as a result 50 per cent. stronger than other makes.

The effect of carbon in steel is to add great tensile strength, toughness of fibre and temper, or spring. The strength of 30 point carbon steel is just about one-half more than "hard steel" wire. As it costs only a little more than the other it is evidently much better economy to use it for all purposes possible. Anyone who knows what high carbon wire is, when purchasing fence, never fails to see that it is made of high carbon steel.

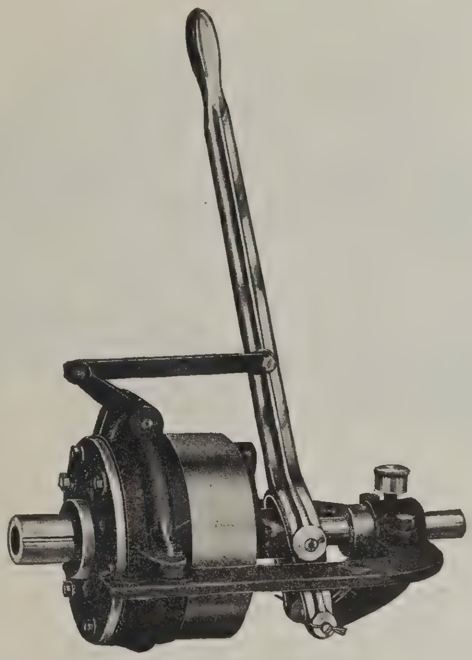
Page fencing is "coiled"—not crimped—and is the only fence that is "coiled." Being "coiled" lengthwise from end to end, there is no sagging, but an instant springing back to place after being forced out of position.

The stronger wire can be stretched much tighter, the coil regulates the tension, and consequently fewer posts are required.

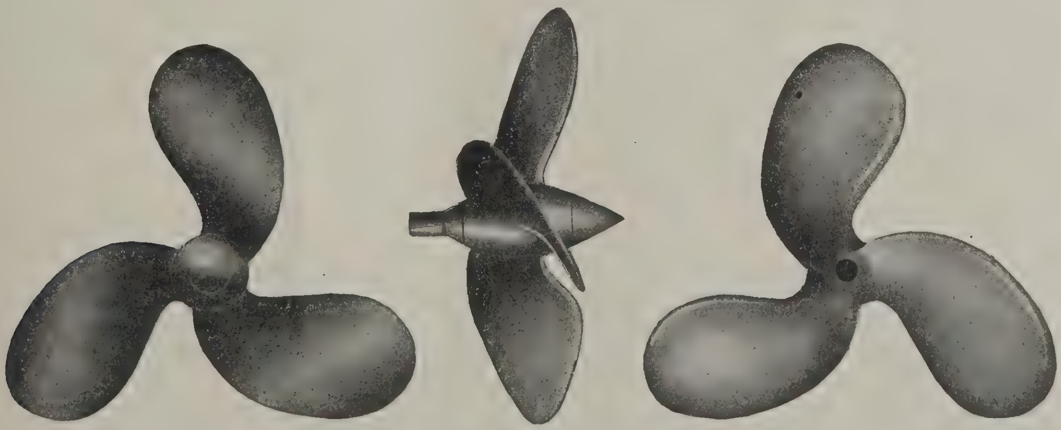
Page fences, being made of wire having one-half more strength than the fence wire ordinarily used, can be stretched that much tighter, and consequently will not need posts so close together. A saving of 25 per cent. of the posts is a big item, for you will, of course, save the cost of setting, as well as the post itself. This saving in the post makes the total cost of Page fences much less than others. Besides, what is the most important of all, you get 50 per cent. more strength, as Page wire is much stronger than other wire; and, in addition, the wire is "coiled," which makes it so springy that it will stand twice the hard usage that any other fence will stand.

MICHIGAN WHEELS AND GEARS.

The Michigan Wheel Company, of Grand Rapids, Mich., who supply so many engine builders, are in a position to note the rapid increase in the manufacture of marine engines and motor boats owing to the great demand made on their propeller wheels and reverse gears this year, which have been supplied to over 800 engine builders, and sales have been made amounting to over $75,000 so far this year. It is evident that 1907 has been a banner season among engine builders, boat builders and builders of accessories. Some of the largest buyers of the Michigan goods are: Regal Gasoline Engine Company, Ferro Machine & Foundry Company, Lozier Motor Company, United Manufacturing Company, John Millen & Son, B. C. Boat & Engine Company, Brooks Boat Manufacturing Company, Fairbanks-Morse Can Manufacturing Company, the Fairbanks Company, Fairbanks-Morse Company, International Harvester Company of America, DeMooy Brothers, DuBrie Motor Company, Arthur Duvic, Detroit Gas Engine & Machinery Company, Hildreth Motor Company, Royal Gas Engine Company, Roberts Motor Company, Scripps Motor Company, Toquet Motor Company, Truscott Boat & Auto Supply Company, Winton Motor Carriage Company.



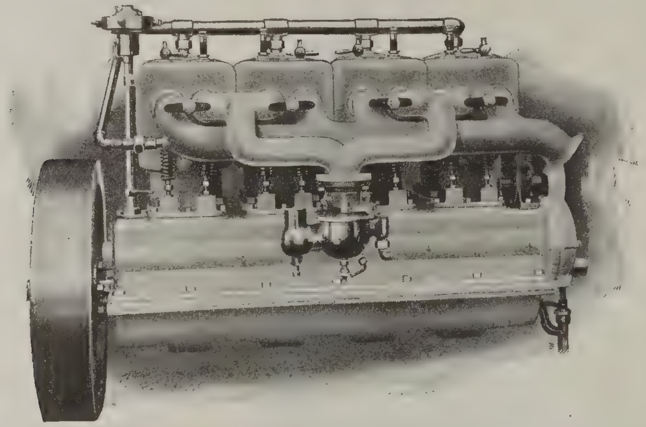
MICHIGAN GEAR.



MICHIGAN PROPELLER WHEELS.

A FOUR-CYCLE MOTOR THAT IS SIMPLE.

Simplicity—the avoidance of complicated mechanism—is the dominant feature of the Scripps marine motor, manufactured in Detroit, Mich., by the Scripps Motor Company. The Scripps four-cycle engine is designed and built upon established principles. The makers have bent every energy toward simplifying it; their constant endeavor has been to produce a four-cycle marine motor that would be almost as simple in construction and mechanism as the two-cycle type. That they have succeded is well attested by the popularity of the Scripps motor with both the novice and the well-versed in marine mechanics. Marine engine men who are thorough students of the subject pronounce the Scripps motor a most decided step forward in four-cycle construction, and long ago predicted that it would successfully meet and vanquish the objections urged against it by the two-cycle disciples.



SIMPLE FOUR-CYCLE MARINE MOTOR.

The Scripps engine is so simple and so easy to operate that the beginner has no difficulty in manipulating it. It combines all the four-cycle points of advantage, namely: greater power, considering the weight of the engine; less vibration and racking of the boat; greater economy, as much less fuel is used; and it starts without cranking. Not only in factory tests, but in actual working-out runs on the water, the Scripps has proved itself; and for downright hard work and continuous running this engine is said to be remarkable. The 15 horse model, which develops up to 20 horse, has been installed in the P. D. Q., a 32-foot semi-speed hull on the Detroit River, and has maintained a speed of 17 3-5 miles per hour (official record)—a remarkable speed for this power rating. One of the most pronounced improvements in the Scripps engine is that the crank cases are made of aluminum. This crank case has been given the most severe tests and strains, and has stood up under them all with absolute satisfaction. It has been demonstrated beyond question that aluminum is just as good for this purpose as iron—better in one respect, in that it is much tougher—will not crack or break like brittle iron. Another advantage is the great amount of weight that they take off the engine; and that advantage will be appreciated by owners of small or light boats.

The system of lubrication is automatic and positive in its action. The splash system is used. The oil is pumped from an overflow at the proper height in the after crank pit, and is returned to the forward pit, whence it flows through each successive compartment, thus maintaining a constant and uniform level in each compartment. A sight feed is provided, that the operator may see at all times whether the oil is flowing. All that is necessary is the addition of a small quantity of oil from time to time. By this method a teacupful of oil will sufficiently lubricate the engine for a couple of hours.

Only the very finest materials that money can buy are used in the manufacture of this engine; for instance, the connecting rods are of Parsons manganese bronze; crank shaft, highest grade carbon steel; cylinders and other castings of highest quality of gray iron. On the point of appearance, the Scripps engine stands unsurpassed. Polished brass is used for all trimmings, and castings are highly finished. The Scripps Motor Company at present manufacture only two sizes, two-cylinder and four-cylinder, but they will soon add the manufacture of a single-cylinder and six-cylinder, making their line one of the most complete on the market today.

MOTORBOAT LUBRICATION.

WITH SPECIAL REFERENCE TO ALBANY GREASE.

Friction is created wherever surfaces are caused to rub one upon the other. This friction, when it occurs in engines and machinery, is injurious, because it causes the wear and tear of the metals forming the bearings and, if allowed to go on, is likely to lead to other evils, such as distortion of the machinery, breakdowns, etc. It is not possible to avoid it altogether, but it can be kept down to a minimum amount by the proper application between the rubbing surfaces of lubricants having enough viscosity or body to keep the surfaces from coming into contact under the maximum pressure which may be applied to them.

In the operation of a motorboat, lubrication should receive the closest attention, for, since wear is invariably the result of friction, worn bearings indicate wasted energy. Albany grease is a clean, safe and most economical lubricant. It is always uniform in quality, is cleaner than oil, and does not drip, splash or waste away. It stays where it belongs and does the work that it is supposed to do. It is cheaper than oil; a little goes a long way, and the "way" is made a smooth one.

Albany grease has been on the market for forty years and is universally used as a most satisfactory lubricant for all bearings, on account of its splendid wearing properties, due to its great capacity for storing and carrying away heat, and thus keeping the bearing cool. It is free from impurities, always uniform in quality and is suited to all conditions and climates. Having comparatively low melting points for different consistencies, it will more readily melt, and thus lubricate, cool and preserve a bearing which, from carelessness or inattention, would otherwise burn or cut out and be practically destroyed by the use of mineral greases with high melting points.

Albany grease is made in seven numbers, all of which are of the same quality; the only difference is in the consistency, which varies to fit different climates, conditions and circumstances. No. 3 is especially adapted for use on all stationary, marine and tug-boat engines, also on shafting, dynamos, general electrical and high-speed machinery. Atmospheric melting point, 100° to 110° Fahr.

Albany grease is put up in packages of various sizes. In cans (special) containing 1 pound. In cans containing 5, 10, 25 and 50 pounds. In kegs containing about 125 pounds. In half barrels containing about 200 pounds. In barrels containing about 400 pounds. It is also packed for export in cases containing 100 pounds net, or 122 pounds gross. It costs nothing to try Albany grease, as the makers, Adam Cook's Sons, 313 West street, New York City, will send a sample, with one of their Albany grease cups, free of expense upon request.

EUREKA ELECTRIC COMPANY CHANGE.

The Eureka Electric Company, of Peoria, Ill., has sold its plant and business to the Cracraft, Leich Electric Company.

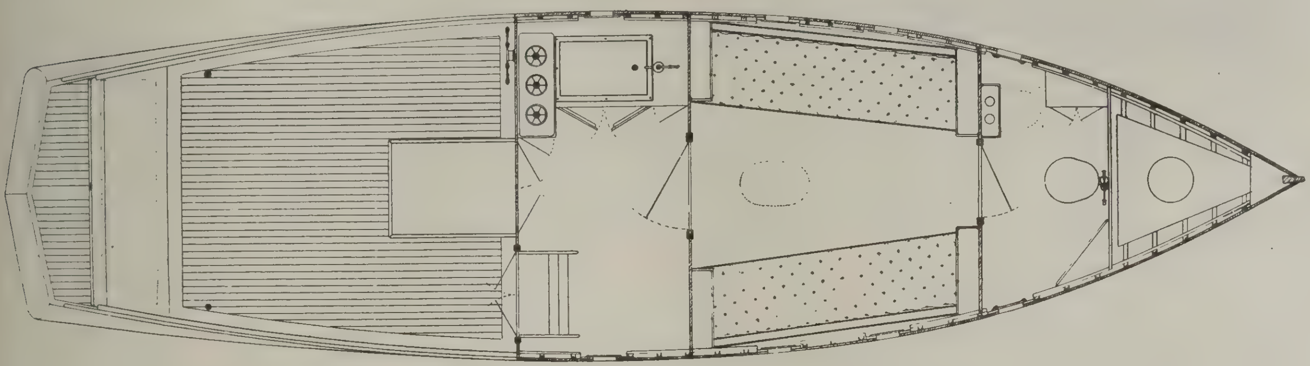
The gentlemen composing the new company are experienced telephone men, formerly connected with the Stromberg-Carlson Company. They will start with ample capital and will, beyond doubt, do a large business.

Howard W. Foote has been appointed to liquidate the affairs of the Eureka Electric Company.

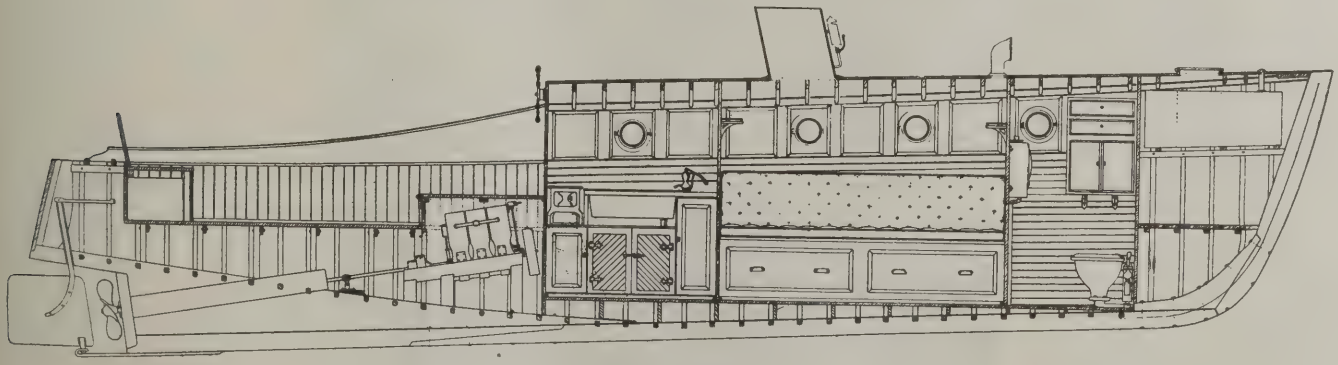
AN ATTRACTIVE MODEL OF CRUISING LAUNCH.

There is always a peculiarly personal interest attached to the examination of yacht plans and models in the mind of the average man. In these days the rush and restlessness of the times is manifesting itself in all forms of recreation, and in none less remarkably than in the demand for speed motor boats and automobiles. And yet a reaction seems to have set in against extremist ideas in this direction, and the major part of the constantly increasing flood of inquiries for boats, launches and yachts is now from seekers after a combination of speed and comfort. To this end the latest models of American builders are being more and more adapted. The plans which are printed herewith illustrate a distinctively 1907 model, of which several examples have already been launched this season. Its builders, the Bay City Boat Manufacturing Company, of Bay City, Mich., term this a Tarpon Standard Stern Cabin Launch or cruiser, and call attention to the adaptability of the model for either outside or inside cruising. It is claimed that its lines are such as to make it an easy driver, of good speed yet requiring comparatively moderate power, while the high freeboard is a protection in rough weather. The dimensions of the launch as shown are: Length over all, 30 feet; beam, 8 feet; freeboard, 5 feet; amidship, 4 feet; aft, 2 feet 4 inches; draft, 1 foot 6 inches; speed with 11 to 20 horse-power engine, 9 to 13 miles per hour.

This launch will carry from 25 to 30 persons, and is fitted up for comfort. There are folding sleeping berths for four persons, lavatory, toilet, ice box, lockers, upholstered seats, mirrors, etc., and provisions can be carried for several days' cruising. In addition to its roominess, comfort and seaworthiness, it has the further attraction of very moderate cost. A smaller boat of the same design and model, but only 25 feet over all, is also offered by the same builders, a new company but composed of practical and experienced men. Over fifty new designs of completed pleasure craft, including special launches and sailboats are listed in their 1907 catalogue in addition to actual size paper patterns or knock down frames for the use of those who prefer to build the boats themselves.



DECK PLAN.



CROSS SECTION.

TANDEM COUPLE TYPE BATTERIES.

The Gould Storage Battery Company, of New York, has issued a circular descriptive of its Gould tandem couple type batteries. The essential characteristic of this cell is that the plates are set end to end in each cell, one positive plate and one negative plate only in each glass jar. This differs from the old method of placing plates side by side in the jar or tank, where the charging and discharging took place from one side of each plate only. With the plates placed end to end, the discharge takes place from both sides of the plate, and from practically all parts of the plates at once, as the current rate is very low for this class of work. This construction eliminates the chance of grounding or short circuit between plates, for which there is more or less chance when plates are placed side by side. An advantage of this new design is that the removal of any couple for inspection, cleaning or renewal is not attended by the unbolting of connections, sawing of lead, the accompanying lead-burning outfit, etc. The positive plate of one cell is lead burned to the negative of the next cell, no bolted connections being used whatever except at the end of the rows. This insures perfect contact between all the cells and eliminates all chances of the circuits being interrupted on account of poor connections.

ENTERPRISING TABLE MAKERS.

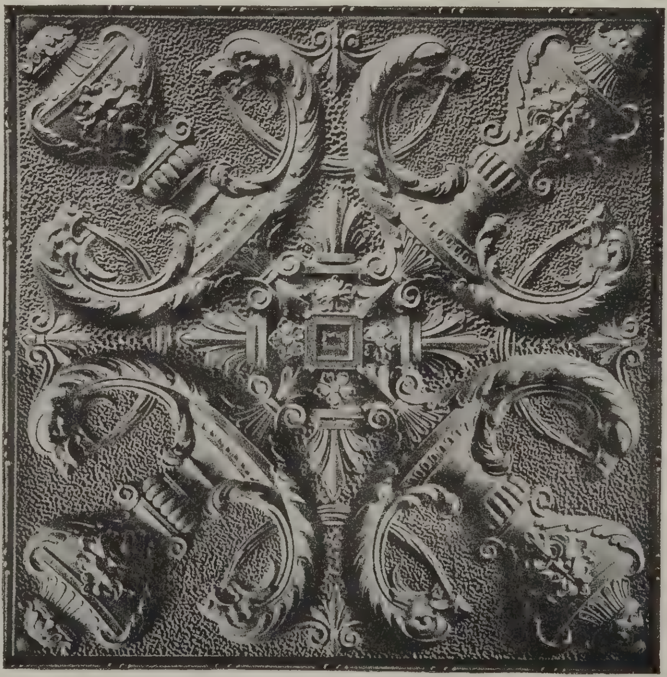
A glance through the catalogue of the Bockstege Furniture Company, of Evansville, Ind., gives an excellent idea not only of the attractive line of tables offered but of the enterprising methods of this firm. This latter is shown by the clever use of catchy wordings at the head of each page. These wordings take the place of a long introduction, such as many catalogues contain and such as is often made ridiculous by too many claims. Among the short, pithy lines in the Bockstege catalogue which attract the eyes and impress the mind of the furniture dealer and buyer may be mentioned the following: "No goods shipped out not up to our standard," "Our finish is thorough and lasting," "We are leaders and will continue so," "Durability is a feature of our tables," "We will hold your trade if once you try our goods," "A child can open and close our tables," "Prompt shipment our strong feature" and "Skilled workmen only employed."

POPULAR TABLE.

This company report good foreign sales for their line of tables, jardinière stands and pedestals. A feature of this line is that they cater to the high priced as well as the low priced trade.

METAL CEILINGS.

The accompanying illustration shows the Eller Manufacturing Company's latest design of metal ceilings, and known to the trade as their Italian Renaissance. This plate can be used as a field plate, and it also can be used as a center. This, of course, is but one member of the Italian Renaissance designs; in this class there are possibly forty different designs, and there is no end of the combinations that can be made.



ITALIAN RENAISSANCE CEILING DESIGN.

To get these Italian Renaissance metal ceiling designs before the public has been the work of two years. People who are not familiar with the manufacture of metal ceilings have no idea what expense the manufacturers are put to in order to get these before the trade.

In the first place, an artist of experience and reputation is engaged to design patterns that combine the highest artistic merit and mechanical accuracy. Some designs are perfect, from an artistic point of view, but the average buyer selects a less artistic design because his untrained eye does not see the merit in the more artistic design. These designers of metal ceilings are artists trained in the art schools, and are professionals that demand large fees for this class of work, and the manufacturer is quite willing to pay a big fee if he can get a pattern that meets with a big sale.

After the design has been submitted and accepted it is turned over to a modeller, who proceeds to work it into clay. It then goes through a multiplicity of operations until it is made up into steel dies ready for stamping.

Only the finest grades of sheet metal are used for this class of work, as the ordinary sheet steel will not stand stamping. After the sheets are stamped they are taken and resquared and sized, so that the sheets will match up perfectly when put upon the ceilings and side walls.

There is nothing before the public today in the way of ceilings or side walls cleaner from a sanitary standpoint and sightlier from an artistic standpoint than metal ceilings. At the factory it is given a primer coat of blue paint, which very readily takes a coating of white enamel after the ceiling is in place, and this makes a very clean and sightly looking room. After a few years, if it becomes soiled, it can be gone over with a damp cloth and made to look as good as new.

SUITABILITY OF LUBRICANTS.

The requirements of a good lubricant are commonly stated as follows:

1. Sufficient "body" to keep the surfaces apart under conditions of maximum pressure.
2. The greatest possible fluidity consistent with the above.
3. The lowest possible coefficient of friction in actual service.
4. Maximum capacity for absorbing and carrying off heat.
5. Freedom from any tendency to oxidize or gum.
6. Absence of acid or other corrosive ingredients and freedom from gritty matter.
7. A high "flash point," or temperature of vaporization, and a low congealing or "freezing point."
8. Thurston in "Friction and Lost Work" includes one more specification. He requires that there shall be "special adaptation to the conditions as to speed and pressure of rubbing surfaces under which the unguent is to be used.". The purpose of the present remarks is to explain in some detail the significance of this last requirement, which is so often overlooked.

It is not taking too great a liberty to assume that the products of any reputable maker of lubricants may be accepted without fear of their containing grit or corrosive acid, or of their having a large content of gumming or oxidizing oils. Mineral oils are well free from any tendency to gum, though tallow greases have often been observed to have gummy deposits in bearings, perhaps due to residue of soaps or decomposition of fats. As to flash points and freezing points, any engineer can make a reasonably accurate estimate of these without trouble. Sufficient "body" is evident if a bearing will not run hot under a lubricant. This leaves three requirements to be discussed—the greatest possible fluidity, lowest possible frictional coefficient and this matter of adaptability. The only possible way to determine how thin an oil may be used is to *try it and see.* The thinner the oil or grease, the less its "viscosity" or "body," and the less will its presence retard the motion of the lubricated surfaces. If a layer of lubricant is interposed between two metal surfaces and is thick enough to completely separate them, the friction of the different particles or layer of the lubricant one upon another, the fluid friction, or internal friction of the lubricant, as it is often called, represents the frictional loss. It is evident that to keep a given bearing as cool as possible there must be an adjustment of the *body* and *fluidity*.

Closely related to these requirements is the quality of suitability or adaptability. Actually, every bearing presents certain differences from every other bearing, even similar ones, albeit these differences are often microscopic. Theoretically every bearing requires separate consideration, and the selection of an oil or grease that will give the best results; practically, this would be ridiculous, but there is a limit beyond which this grouping of bearings and lubricating each group with a certain oil may be carried at a sacrifice of economy. Only careful study will determine how few different lubricants should be kept on hand to reduce friction to the lowest.

While it is of prime importance to prevent overheating, wear and tear and failure, due to lack of proper lubrication, it is fair to assume these things as accomplished in any well-regulated plant or factory.

The great purpose of lubrication is to prevent friction, and it is a matter of common knowledge that heating means excessive friction. Few realize, however, that even bearings developing considerable friction may not heat up; a copious supply of oil carries off the frictional heat so that it does not appear. But all that friction means lost power and fuel and increased wear. Hence the importance of this matter of suitability. Just because an oil or a grease keeps a bearing reasonably cool is not final proof that there is not another lubricant with which it will run even cooler. Some bearings run perfectly cool on grease, but there is abundant evidence that grease-lubricated bearings consume more power than the same surfaces lubricated with oil, the explanation being the greater viscosity of the grease. There is, however, a class of lubricants known as non-fluid oils, such as those made by the New York and New Jersey Lubricant Company, of New York City, in which the cleanliness of grease has been attained without the objectionable increase in viscosity—hence without the retarding action so frequently reported in the case of grease-lubricated machinery.

Suitability means more than the mere selection of a lubricant that will keep the friction at the lowest possible point. It often happens that there are other considerations far more important than friction, and usually these are related either to the means of or opportunity for applying the lubricant, or to the difficulties and damage arising from the presence of oil on floors, wells, goods in process of manufacture, etc. In such cases cleanliness must first be attained, and after that low friction, or else the lubricant is not suitable. There are many of these special applications where the general rules and fundamental principles have to be set aside for reasons of still greater importance. Sometimes, in cases where the oil stains must be avoided, animal oils are employed, because of the ease with which they can be washed out compared with mineral oils. Sometimes greases are used with a measure of success. Non-fluid oils cover cases of the sort mentioned, and the degree to which they are rendered non-fluid is governed by the requirements of the case. It is possible to obtain almost any density or body.

Perhaps the main thought to be emphasized in discussing the matter of suitability of lubricants is for the user or buyer not to rest satisfied with a lubricant until he has studied the matter out with scrupulous care from every point of view.

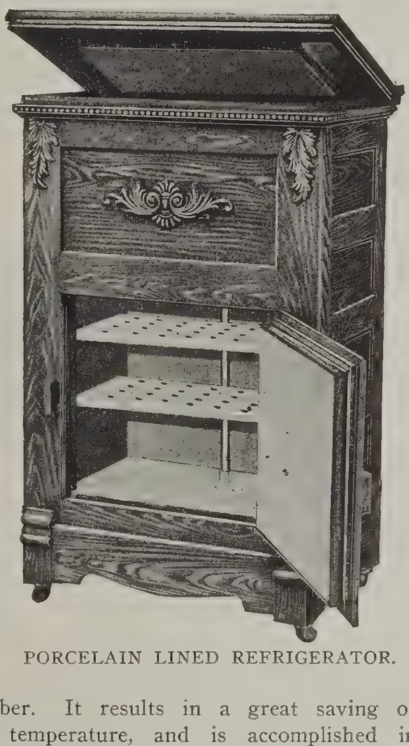
The cost of lubrication is not merely the cost of the lubricant, but the cost of labor, repairs, damage (if any) and friction accompanying its use. To be able to reduce friction two or three per cent. in a plant of any size will pay for difference between the cheapest lubricants and the dearest, many times over. To lessen a fire risk or damage to manufactured goods through dripping and spattering oil it is well worth while to spend time and trouble finding the right lubricant that combines dripless properties with low friction. To the man who simply knows that oil is oil, and grease is grease, and as long as you get enough of either on a bearing and have no trouble all is well, these remarks have no direct message, unless to help open his eyes to greater possibilities.

To the engineer who is anxious to show results and to "stop leaks" wherever he can, the writer's earnest advice is not to rest from experiment and trial until he has found truly suitable lubricants for the machinery under his care, and proved their suitability.

SCIENTIFIC REFRIGERATION.

The preservation of food is a noble object and worthy of the inventor's and mechanic's most careful efforts. For more than twenty-five years the Grand Rapids Refrigerating Company, Grand Rapids, Mich., has given constant attention to this subject, and the improved quality of its goods and steadily increasing trade are evidence that it has succeeded in producing an article which meets with universal approbation.

Their Leonard cleanable porcelain lined refrigerator is especially popular. They manufacture refrigerators of ash, oak and genuine porcelain on sheet steel. Ash and oak refrigerators have quarter-sawed oak panels for the front doors, and are finished in golden oak. The latest style of refrigerator which is put on the market is an all porcelain refrigerator, which is porcelain on the interior of the ice chamber and provision chamber and solid porcelain on the exterior.



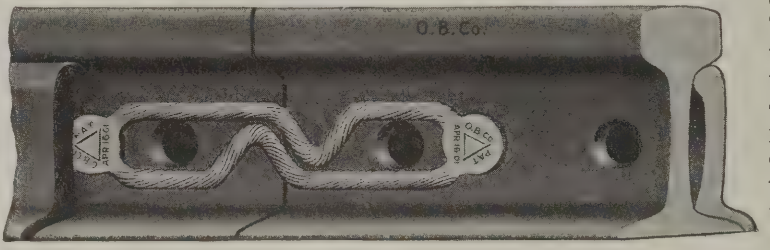
PORCELAIN LINED REFRIGERATOR.

They are said to be the only manufacturers of refrigerators who have a complete plant for the production of enameled steel linings. This enables them to control the quality of the material they offer, and also to bend and stamp it to fit the different sizes of refrigerators before it is enameled.

The Leonard system of refrigeration consists in discharging partially cooled air into the ice chamber. It results in a great saving of ice and much lower temperature, and is accomplished in the following manner: The inner walls of the warm air flues—which are movable and constructed of galvanized iron—are kept cool by the ice in the box. This offers a condensing surface to the ascending warm air, and partially cools the air. All vapor condensed here runs down the iron and is caught by the bottom of the ice box, which projects beyond the iron for this purpose. The air is next passed over the ice, where it is again condensed and cooled, then under the false bottom as shown by the arrows, where it is further condensed, to the center, where it passes to the provision chamber, pure, dry and cold, falling to the bottom and forcing the warm air up into the ice box to be again condensed and purified.

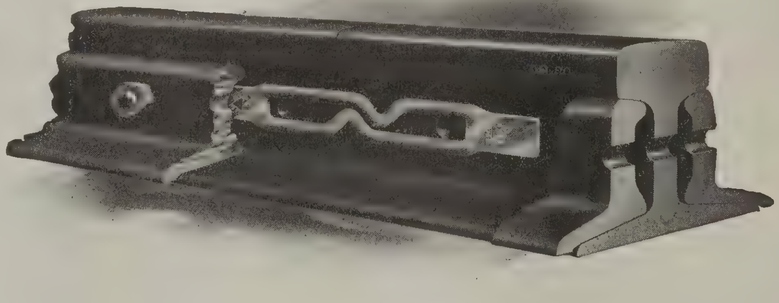
EFFICIENCY IN RAIL BONDING.

Requirements of a satisfactory rail bond are three in number: First, low resistance both within the bond itself and in the contact between the bond and the rail; second, flexibility coupled with long life; third, adaptability to the space. A bond which satisfactorily fulfills these three requirements becomes an important factor in the efficiency of a railway system. The tendency is becoming constantly stronger among far-sighted managers to make the bonding as efficient as the power plant and outgoing feeder system, for the reason that the latter, no matter how well designed and constructed, are working at a disadvantage when the return current is retarded by poor bonding.



With the power station generators working at full voltage and with an ample outgoing feeder system installed, a condition of poor or low voltage at different points on the line—generally at points distant from the power station—means one of two things: either the station equipment must be helped out by the addition of a booster generator at the station, and possibly by the installation of storage battery stations at different points on the line, or the efficiency of the track return circuit must be increased by good bonding. The first-mentioned expedients would entail heavy expense. By increasing the efficiency of the bonding, however, the difficulty may often be overcome at a small increase of expense as compared with additions to the power equipment, thereby increasing the efficiency of the system as a whole.

Another point to be considered also is the continuous waste of energy present at every poorly bonded joint. Individually these losses are comparatively small, but when it is remembered that with 30-foot rails there are 352 joints per mile for single track, these small quantities collectively mount up to a large quantity, which represents a dead loss.



"All Wire" rail bonds, as manufactured by the Ohio Brass Company, of Mansfield, Ohio, U. S. A., embody to a very high degree all three of the essentials of a good bond—namely, conductivity, flexibility and adaptability.

The exceptional conductivity of the "All Wire" bond is due to the process of manufacture, which makes possible the production of a bond which is one solid, homogeneous body from terminal to terminal without a joint of any description. This is accomplished by making the bond from two lengths of soft-drawn copper cable, of sufficient length to form both the body of the bond and the terminals. The two lengths of cable are placed side by side and the ends bent over at right angles to the body. The bent-over portions contain just the right quantity of copper to form the terminals, and are placed in a special die and compressed under hydraulic pressure to the approximate form of the terminal. The ends are then heated to a welding temperature and forged in a second die, which forms the terminal into a homogeneous body, with no breaks or oxidized surfaces between it and the body of the bond. The terminals are then finished cold in a third die. The process is the same for both the compressed and soldered terminal form of bond, the shape of the terminals only differing.

The accompanying illustrations show the compressed and soldered types of bonds installed on the rails.

The flexible feature of the "All Wire" bond is one of its strongest points. The natural spiral twist of the stranded copper cable distributes the stresses which come about through contraction and expansion of the rail and through vibration of the rail joint equally throughout the body of the bond. This means that each strand takes an equal amount of the stresses, which are not concentrated at one or two points, as at the shoulders of the terminals. This feature adds very materially to the life of the bond.

Adaptability of the "All Wire" bond is greatly increased by the spiral stranded construction. When the bonds are installed under the fish plate the spiral arrangement of the strands allows of compression and flattening out of the bond to conform with the confined space, without crushing or pinching the bond to such an extent as to cut off or injure the strands.

AUTOMOBILE JACK.

The special Automobile Jack which is one feature of the varied line of hardware specialties manufactured by Lane Brothers Company, Poughkeepsie, N. Y., is meeting with increasing favor among buyers of motor supplies throughout the world, following its first introduction into England a year or two ago. The extensive line of door hangers made by the same company is reported to maintain its prestige in Germany, Australia, South America and other markets where the goods are well known. This house also manufactures over twenty different models of coffee mills.

CRESCENT TOOL COMPANY.

It is announced that the co-partnership of J. P. Danielson & Co. has been dissolved, and the business of this well-known firm of manufacturers of special machinery, tools and hardware specialties has been taken over as a going concern by the Crescent Tool Company, incorporated for that purpose. The officers, as well as the stockholders, of the corporation were formerly associated with the co-partnership and are thoroughly familiar with the business.

A new drop forging department has recently been added to the plant which, with the addition of special machinery and other extensions, will enable the corporation to properly take care of the increasing business and maintain the reputation for quality of goods which the co-partnership has enjoyed.

Mr. Karl Peterson is president of the Crescent Tool Company.

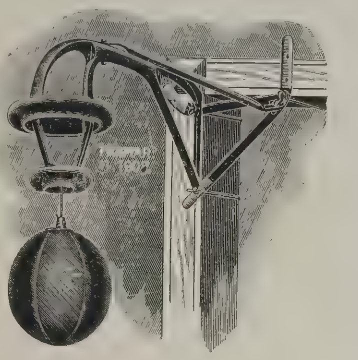
Among the largest stocks of American hardware carried in England is that of J. C. Plimpton & Co., of Liverpool. Here is always to be found a large line of American locks of all kinds; butts and hinges and builders' hardware generally, shelf brackets, bird cages, saws, choppers, etc., as well as agricultural, horticultural and dairy goods, such, for example, as lawn mowers.

PUNCHING BAG OUTFITS.

Among the various forms of exercise that command the attention of men from time to time there is one which always remains popular, and that is, bag punching. It is easy to understand why this should be the case, if it is compared with some of the other methods which are occasionally in vogue. Golf requires an opponent and is unavailable in bad weather; tennis presupposes a degree of health and strength which cannot always be relied upon, and both golf and tennis necessitate the maintenance of expensive grounds and clubs in order to exist. Dumbbells and Indian clubs are amusing for a time and beneficial in their results, but they grow monotonous, and without enthusiasm no form of exercise can produce the effects for which one is striving.

Bag punching, however, is not an expensive game, the initial cost is all, and the bag is always ready for the battle in fair weather or in foul. The bag becomes an active opponent, seeking to elude the blows of the man, and as every day's practice shows a gain in proficiency the game never flags in interest, and the results in health are speedily and continually apparent. The various muscles and organs of the body are developed and strengthened, the nervous system takes a new lease of life, the brain acts more quickly, the eyes become keener, the waist grows smaller, and the chest rounds out.

The Twentieth Century style of punching bag outfits is one to be particularly recommended. They are made by the Victor Sporting Goods Company, of Springfield, Mass., U. S. A., and are adapted for home, office or gymnasium use. As compared to the old style, they have the same free action and are just as fast and more durable. They occupy only one-fifth the space, weigh only one-fourth as much, make less than one-third the noise, and cost only about one-half.



The No. 2 style, which is shown in the cut, is designed to be taken up and down as needed, and the leather covered clamps prevent any damage to the woodwork of the door. The No. 3 style is designed to be kept permanently in place, and is secured by screws rather than by clamps. The No. 4 is the gymnasium style, and is meant for a permanent fixture. The No. 2 and No. 4 styles are adjustable. They average about twenty-five pounds each when packed for shipment, and can be had through any export house at prices which will attract.

Pamphlets with complete description are mailed on application by the manufacturers.

TRADE PUBLICATIONS

Shoes.—Following its semi-annual custom, the Selby Shoe Company, of Portsmouth, Ohio, has brought out the fall edition of its 1907 catalogue, in which is listed its large line of shoes, accessories, etc. This company devotes its attention exclusively to the manufacture of women's shoes.

Building Papers.—An attractive pen and ink sketch by a New York artist has just come in from F. W. Bird & Son, East Walpole, Mass., in the shape of a poster. The subject is "The Neponset Girl," and it is an original piece of work. The circular accompanying the poster reads as follows:

"The 'little girl' Neponset trade mark, reproduced on this sheet, has probably become more familiar to architects, builders and users of building paper than any other trade mark associated with building material. Every roll of Neponset waterproof building paper and all our advertising have borne this trade mark ever since we first made Neponset, twenty-one years ago. The Neponset Girl Poster celebrates the twenty-first anniversary of the 'little girl's' birthday, and shows her as she looks today."

This neat poster is now being freely distributed among the customers and friends of the above concern, and to any architect or engineer not on the firm's regular list a copy will be mailed upon receipt of 4 cents in stamps to cover postage.

Electric Crane Controllers.—The Cutler-Hammer Manufacturing Company (Milwaukee), makers of electric controlling devices, have just issued a booklet—pigeonhole size—descriptive of their line of electric crane controllers. In addition to full descriptions and illustrations of five types of crane and hoist controllers, the booklet contains connection and dimension diagrams, repair part charts, prices, net weight and shipping weight of apparatus, etc. An improved form of contactor for handling heavy currents is also described.

Electrical Apparatus.—Under the title of "Hawthorne Works," the Western Electric Company, 259 South Clinton Street, Chicago, Ill., has just issued an illustrated and descriptive booklet which is interesting from many points of view. The book contains, in addition to a description of the company's new 110 acre plant at Hawthorne, Ill., considerable information about electrical apparatus of various kinds, also several miscellaneous articles of interest and value. Among the latter may be mentioned two which are treated at considerable length, namely, "Perfect Fire Protection" and "Storing Coal Under Water." This latter is a method which eliminates spontaneous combustion and has proven successful by important experiments held by the authorities of the British Admiralty at Portsmouth, England. It is comparatively new in this country.

Heretofore the name of the Western Electric Company has been principally mentioned in connection with the manufacturing of telephone apparatus. The completion of the Hawthorne works, however, has placed the company in position to build electric power apparatus and switchboards up to and including the largest sizes used for street railway service. Its plant is equipped with every known modern labor saving device, and its facilities are unsurpassed for the expeditious and economical building and handling of power apparatus.

Toys, Etc.—Dealers in domestic toys and specialties will find much to interest them in the catalogue just issued by Steinfeld Brothers, of New York. It illustrates a very large assortment of such articles, including many which have proven unusually popular abroad.

Metal Shingles.—The Eller Manufacturing Company has just issued a small hand catalogue, illustrating its champion lock joint metal shingles, and all those interested in metal shingles can have a copy by sending the inquiry to the company's office. This new lock joint on champion shingles is one of the most ingenious devices that have yet been patented, and buyers of metal shingles will be interested in this book.

PUBLISHER'S PAGE

AMERICAN EXPORTER

With which is incorporated
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The AMERICAN EXPORTER, established more than thirty years ago, is the pioneer and the most extensively circulated publication devoted to furthering of relations between importers and merchants the world over and manufacturers of American goods. It is published on the first of each month in English and on the fifteenth in Spanish (EXPORTADOR AMERICANO).

The AMERICAN EXPORTER is both independent and impartial. Its publishers have no connection with any manufacturing concern, export house or other business except publishing, and hence have no outside interest to serve. The editorial management is separate and distinct from the business department.

Subscription price to any part of the world, including postage, $2 per year, American gold, or its equivalent sum in any other currency. Single copies, 20 cents.

CUBAN TRADE TOUR.

A commercial publication is a means of communication between the buyer and the seller, a forum for the discussion of topics of interest and value to these two parties in the business world, and a means of mutual understanding between them. It is a little less intimate than a personal letter, a good deal more so than a circular. But just as these two latter methods of intercourse may be materially supplemented to advantage at times by a personal meeting, and confidence in the written word be fostered by mutual acquaintance, so the work of a commercial paper may also be thus supplemented by a personal acquaintanceship.

It is with this idea that the AMERICAN EXPORTER has during the past two years sent representatives on foreign trade tours, the most comprehensive of which is now in progress in Europe by the editor. And it is with the same idea that the AMERICAN EXPORTER announces its sixth trade tour, this time to Cuba.

Mr. Clinton P. Lampman, Western manager of the AMERICAN EXPORTER, will visit Cuba early in November. His aim will be to become better acquainted on behalf of the publication, and of American manufacturers, with Cuban merchants and importers, and as well to give them any information which they may desire in regard to American goods and of American trade conditions.

In connection with the AMERICAN EXPORTER'S Cuban trade tour, the November edition of the paper will constitute a special Cuban number. The editorial department is now at work preparing an edition which will reflect the industrial development and progress of the island, its trade opportunities and its agricultural conditions. This number will undoubtedly be of great interest not only to the Cuban business man, but to the commercial world at large, more especially throughout Spanish America. Sample copies of the Cuban number will be mailed without charge on request.

DOMESTIC SUPPLEMENT.

Heretofore the AMERICAN EXPORTER has in its pages discussed foreign trade fully from the standpoint both of the foreign buyer and of the American manufacturer.

The subject, however, has grown too large for such treatment any longer, and it has been deemed necessary to divide the two subjects editorially. Beginning, therefore, with the next number—November—there will be published a "Domestic Supplement" to the AMERICAN EXPORTER. This supplement will be aimed editorially at the American manufacturer, and will be circulated only in the United States. Information as to shipping and consular arrangements, packing requirements, trade routes and conditions will be given in this part of the publication. Its effect, it is hoped, will be to materially facilitate international business relations.

The attention of foreign importers, commission men and manufacturers' agents is called to the medium which this supplement offers them to bring their names before American manufacturers seeking foreign connections. A very moderate advertising tariff will be in force for announcements in this supplement, which will have a guaranteed circulation of 5,000 among American firms engaged in or seeking foreign trade. The November issue will devote especial attention to Cuba, owing to the impending trip by our representative; hence it should prove a special opportunity to Cuban firms desiring to represent American manufacturers. In the advertising section this month there will be found further details of the supplement.

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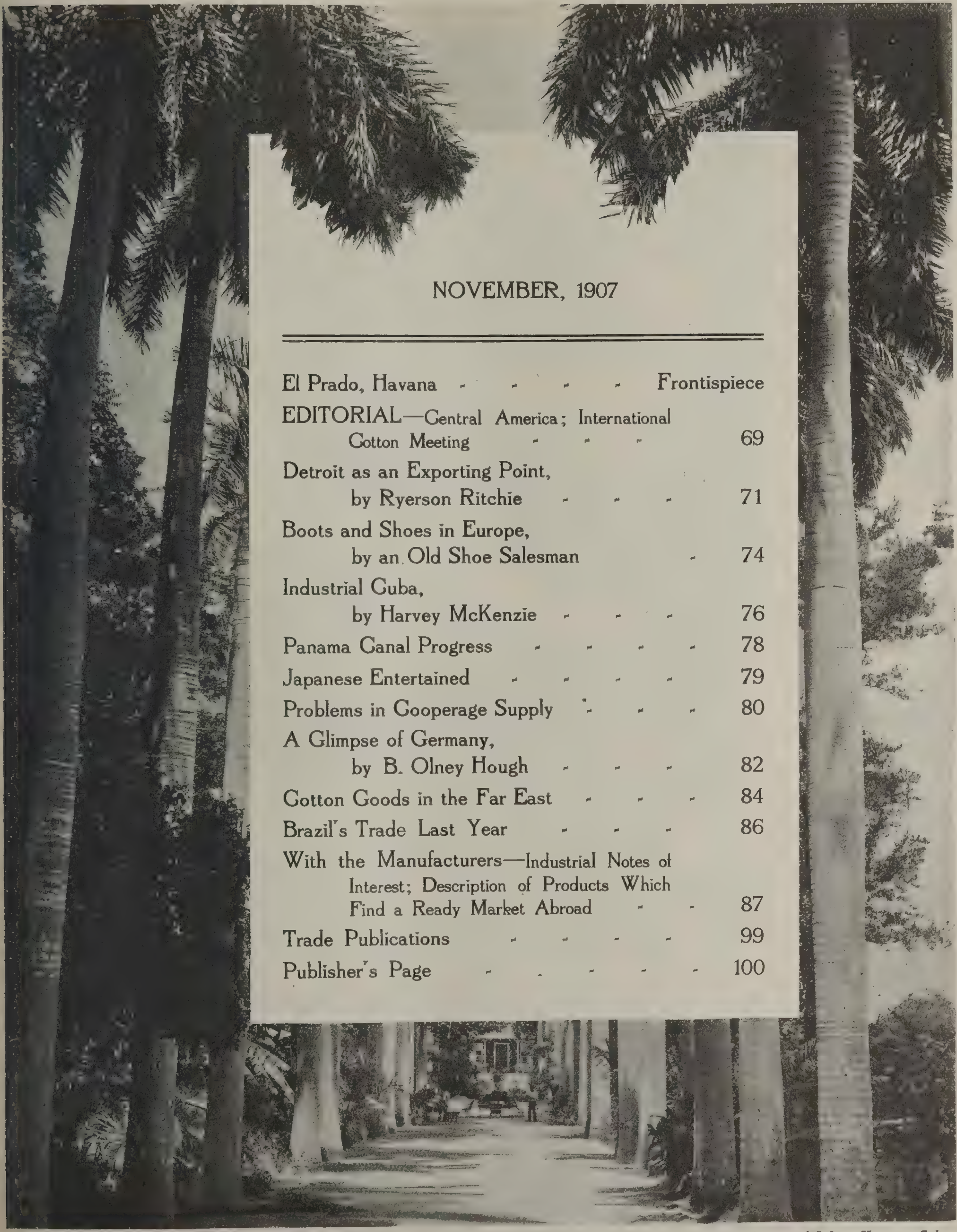

Avenue of Palms, Havana, Cuba.

During the twelve months ending with November, 1907, 211,200 copies of the American Exporter were circulated—an average of 17,600 per month. Subscription Price, $2.00 per Year. Single Copies, 20 Cents.

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EL PRADO, HAVANA.

(See Page 76.)

AMERICAN EXPORTER
EDITORIAL

The AMERICAN EXPORTER is both an independent and impartial trade journal. Its publishers have no connection with any manufacturing concern, export house or other business except publishing and, hence, have no outside interest to serve. The editorial management is separate and distinct from its business department.

CENTRAL AMERICA.

HON. JOHN BARRETT.

The Central American Peace Conference, to be held at Washington, beginning November 15, calls attention to the International Union of American Republics, and to John Barrett, director of the International Bureau at Washington. Mr. Barrett is a good American in a twofold sense, for his patriotism extends to the entire new world, and he is devoting his life to bringing the several republics into closer commercial and political relations. That his labors are meeting with appreciation is shown by recent letters sent to the bureau. The president of one of the largest manufacturing firms in the United States, which is doing a business amounting to many millions of dollars a year, writes as follows:

"The facts and figures you have sent me are astonishing. I am ashamed of my own ignorance of the field. This firm never before considered the opportunity in South America worthy of careful exploitation. We have now decided to send two of our best men, one to the east coast and the other to the west coast, for the purpose of thoroughly studying South American markets and establishing agencies."

The president of one of the leading universities of the country says:

"The list of books in regard to the history, economic development, and present material and political conditions of Latin America which you have kindly sent in response to my inquiry quite overwhelms me. Inspection of our library shows that we have only one or two of these books, but our librarian is now ordering all the others. We intend to outline a special course next year that will take up Latin American history and kindred subjects, and we shall want your co-operation and advice."

A United States Senator, who has always looked upon the bureau as more ornamental than useful, volunteers the following opinion:

"Until recently I have regarded the International Bureau of American Republics as a 'fifth wheel of the Government coach,' and have always thought that the appropriations for it were merely complimentary to the other American republics that joined in supporting it. From letters I am receiving from many of my constituents, who are manufacturers and exporters, I am learning that it is performing a most practical and useful work, and that it is worthy of the interest of Congress."

The agent of an important steamship company makes the following observations:

'We have received during the last six months 200 per cent. more inquiries about our facilities for taking passengers to South America than we have received for many years past. Most of the letters coming to us state that on account of information and printed matter the writers have received from your bureau, they desire to visit South America for the purposes of travel, investment or development of trade."

INTERNATIONAL COTTON MEETING.

A pleasant and interesting feature of the month has been the meeting in New York of the cotton men of that city and 120 delegates of the International Federation of Master Cotton Spinners' and Manufacturers' Association. This was followed by the International Cotton Conference at Atlanta. On October 2 a banquet attended by the foreign delegates and 200 members of the New York Cotton Exchange was the occasion of a number of instructive talks by well known men in the cotton trade.

James H. Parker, president of the New York Cotton Exchange, presided, and on his right was C. W. Macara, of Manchester, president of the International Federation of Master Cotton Spinners' and Manufacturers' Associations. At the speakers' table were: J. R. MacCall, S. T. Hubbard, J. Van V. Olcott, E. M. Weld, A. Warbel, G. Duvillier-Motte, J. F. Maury, W. S. Bennett, H. M. Goldfogle, H. W. Taft, G. E. Waldo, J. B. Tattersall, R. S. Reinhardt, J. J. Fitzgerald, Arthur Kuffler, Clarence Whitman, C. V. Fornes, A. B. Gwathmey, Jr., R. Macaya, H. R. Taveira, A. Buysee, E. Latimer, A. H. Lowe, C. J. H. Woodbury and S. A. Neville.

Mr. Parker said:

I shall speak but few words, and only on an inexhaustible subject which you all know before I tell you what it is. It is one word—"welcome." In your travels over this country you will find many reminders of your own. Many of us came from your country, and others of us can and do with pride trace back and find our forefathers came from the same homeland your forefathers lived and died in. We, in loving remembrance, named many of our counties, cities, streets and children in honor of names familiar and dear to you. We have our own Plymouth, Hingham, London, York and many others too numerous to mention. The country is dotted with the names of Paris and Manchester. For these and many other reasons we think we have the right and we are proud to call you our cousins.

The New York Cotton Exchange welcomes you, New York City welcomes you, the whole country welcomes you. You will find the doors to the hearts of cotton growers, cotton merchants and cotton manufacturers wide open to welcome you. The spindles of our mills, North, South, East and West, are singing joyous notes of welcome for you.

The principal address of the evening was made by Mr. S. T. Hubbard, a former president of the New York Cotton Exchange. In the course of his speech Mr. Hubbard said:

My fellow members of the New York Cotton Exchange have confided to me the pleasant honor of extending on their individual behalf a most cordial welcome to each and every one of the International Federation of Cotton Manufacturers who have journeyed so far on their way to view the cotton fields of the United States. Our representatives welcomed you as you entered our harbor through the beautiful portals of the Narrows to pass beneath the arm of the Statue of Liberty to the pleasures and hospitality of the second city in the world. Their hearty words of greeting I now repeat on behalf of my fellow members; it is our hope and wish that the outcome of your long pilgrimage may be one of education and pleasant experiences to yourselves and that your hosts may profit by your views and opinions as you expect to do by theirs.

It is fitting that you should be so greeted on your arrival in the new world by the members of the oldest and most cosmopolitan organization of cotton merchants in America, the New York Cotton Exchange, who have ever been foremost in adapting the developments of modern science and life to the necessities of the cotton trade; presenting almost annually new methods of transacting business to the spinner and the planter, until he can dispose of his crop before it is planted, if he so desires, while the other is at liberty to contract for the delivery of yarn and cloth months, if not years, in advance of their manufacture and at the same time secure the delivery of the raw material.

Wonderful changes have occurred since the organization of our exchange; the bumper crop of 1871 was less than the yield of Texas and the territory last season; the consumption of American cotton at that time in Great Britain exceeded that of continental Europe, with America third, and the consumption of the Southern mills was but 200,000 bales a year. Now the Southern mills consume 2,450,000 bales; America, including Canada, consumes more American cotton than the Continent, while Great Britain has fallen from first to third place in the number of bales consumed. Finer and finer counts of yarn are produced in Great Britain, where the number of spindles is double those of America and the product of their looms wonderful in lightness of their tissue, beauty of their design.

Cotton cloth has driven linen and woolen cloth from their preeminence on the Continent, where the melting snows of the Carpathians, the Appenines and the Alps have been harnessed to furnish the requisite power for cotton mills. Even Barcelona, the original home of cotton spinning in Europe, has doubled her consumption.

At that time cotton was consigned and held for the demand from spinners—a method which caused wild fluctuations; in 1871 it sold at 13½ cents in New York and within nine months thereafter, in 1872, at 27⅝ cents. Now each bale that is bought by a merchant is promptly hedged on the exchange—principally in New York, until needed by the spinner or passed on to supply some previous engagement entered into between merchant and spinner, until there is less cotton carried by the cotton trade unhedged in proportion to its capital than any other trade.

The largest part of the element of speculation has been passed on to the spinner, who either sells his goods ahead for forward delivery without having the cotton, or buys his supply of cotton without having sold his goods. Ninety-five per cent. of the cotton merchants are more interested in the differences between grades, the question of the correct hedge, and questions of freight exchange and interest than of fluctuations in prices—a complete reversal of the manner of transacting business within the past thirty-five years.

The planter raises too much high grade cotton or too much low grade cotton; it is the business of the merchant to buy what you don't want and hold it until you do. To this end our exchange has developed a method of guaranteeing the grade of cotton coming to this market by means of a fund for that purpose and a paid force of expert classers. We maintain the standard grades adopted in 1886 by all the American markets from which one after another have drawn away and, I am glad to state, our American spinners are now availing themselves in increasing numbers of the services of our expert classers by submitting to their decision questions of grade and staple. By the operation of this guarantee fund no one need fear a loss through errors in classification—this is the only exchange in the world that guarantees the grades delivered under its rules.

C. W. Macara responded on behalf of the foreign spinners to Mr. Hubbard's greeting. Mr. Macara was instrumental in the organization of the international association. He explained that the formation of this association was due to the conditions which confronted the foreign spinners in the short crop year of 1904. The situation that confronted the British spinners was appalling. They realized, he said, that if they continued to run their mills full force they would exhaust the supply of American cotton by May, that starvation would confront the operators, that all cotton and allied industries would be paralyzed. By agreement with the operatives, he said, they reduced the working hours from 55½ to 40 hours a week. This averted the disaster.

It was with reluctance, Mr. Macara declared, that he signed the call for an international meeting, because he thought the spinners might think that the competition would prevent co-operation, but, on the contrary, he found that all the spinners acted together harmoniously, as if of one country.

Mr. Macara then told of the efforts that are being made to encourage cotton cultivation in countries outside of America, and he predicted a large increase in yield, particularly in India. He said the spinners would continue their efforts along this line. He recalled that in the early days of the industry in America slow progress was made in increasing the production.

Mr. Macara then struck the keynote of his speech by saying that the spinners believed in living and letting live, and that the middleman was and always would be necessary to the cotton business. Talk of the spinners and planters coming together to wipe out the middlemen was all foolishness, he declared, and he hoped talk of such absolute nonsense would soon cease.

Mr. Macara thanked the Cotton Exchange for the entertainment and said the coming together of the spinners and New York men would be good for both.

DETROIT AS AN EXPORTING POINT.

Gateway Between the East and the West on the Canadian Border, Home of Great Manufactures, This City's Export Interests Are Great.

BY RYERSON RITCHIE.

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CADILLAC SQUARE, DETROIT.

ALONG the boundary which separates the United States from the Dominion of Canada, extending from Maine to Montana, there are twenty-three customs districts whose books keep record of the volume of merchandise that crosses the border for Canadian consumption or for transshipment through Montreal and Quebec to European ports. The custom houses are located at the crossing points of railroads along the land boundary, and at the leading ports on the Great Lakes and connecting rivers. The volume of business which they record has steadily increased. Even in 1902, when exports of domestic merchandise by way of the Atlantic seaboard and the Pacific coast fell off, those by way of the frontier custom houses continued their upward movement. In the fiscal year ending June 30, 1893, they aggregated $43,413,402. In 1900 they exceeded $104,000,000, and in 1907 they were nearly $200,000,000.

The situation of Detroit at the gateway between the East and the West, the fact that it is a terminal point of the two principal Canadian railway systems, and the crossing point of several American roads, early established its supremacy as a point of departure for goods intended for the foreign markets. Its shipments are far in excess of those of any other port. For a number of years they were about one-sixth of the whole. The last two years they have exceeded one-fifth of the whole. The direct exports from Detroit showed some fluctuations during the periods of tariff uncertainty and changing foreign trade from fifteen to twenty years ago. Those for 1889 were 50 per cent. larger than for 1888, and 43 per cent. larger than for 1890. There was a large increase from 1890 to 1891, and a small falling off from 1891 to 1892, but since the latter year the tide of domestic merchandise that flows across the Detroit River to foreign ports has steadily risen. In 1892 the total was about $6,000,000; in 1897 it was $11,500,000; five years later it had reached $18,694,000, and in 1907 it will exceed $40,000,000.

These exports are as varied in character as they are large in volume. Of the 350 classes and sub-classes into which the schedule is divided, 290 are represented in the tables of Detroit exports. The largest single class is provisions, which in 1906 amounted to $11,560,000. Of this, hog products accounted for $10,335,000. It represented in part the output of Detroit packing houses; in much larger part those of Chicago and Kansas City. Iron and steel and manufactures thereof were represented in forty-four classes, with a total value of nearly $6,000,000, representing a great variety of Detroit manufactures. Cotton and the manufactures thereof amounted to $5,042,000, of which $4,918,000 was for the raw material. The export of breadstuffs amounted to $2,562,000, of which $1,918,000 was in corn. The following classes also exceeded half a million dollars in value each: live animals $1,842,000, of which $1,472,000 was in cattle; coal and coke $797,000, of which $751,000 was bituminous coal; cars, carriages and other vehicles $615,000, of which $270,000 was in automobiles. The reports for the first seven months of 1907 indicate an addition of about 12 per cent. to each of these classes for the current year.

One of the most striking features of the exports from Detroit is the immense proportion of them that goes to the English speaking peoples. In 1903 Great Britain, its colonies and dependencies took $22,403,535 of our products and all the rest of the world only $345,659. In 1904 the proportions were $23,271,205 to the British possessions against $129,646 to other countries. In 1905 the proportions were $31,800,210 to $55,170. In 1906 the distribution was as follows:

Dominion of Canada	$21,847,693	
Newfoundland	150,554	
British Columbia	19,645	
		$22,017,982
England	$13,378,049	
Scotland	250,075	
Ireland	22,442	
		$13,560,566
British South Africa		683,555
British Australasia		143,312
British New Zealand		9,033
Total British possessions		$36,504,448
All other countries		158,748

Of the latter, Japan is represented by $73,539, and Belgium by $67,436, with insignificant amounts to Germany, France, Switzerland and China, and one shipment each to Siam and the Fiji Islands. In this year 99.5 per cent. of the direct exports of Detroit were made to points in Great Britain or its colonies and dependencies.

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GRISWOLD STREET, DETROIT.

In the first seven months of 1907 the total exports were $25,167,267. Of this all but $81,120 went to the British possessions, the later insignificant amount being distributed among the countries of Belgium, Japan, Germany, China, France and the Netherlands in the order named. For many years past the exports to the British possessions have been over 95 per cent. of the whole. The noticeable changes are the great increase in exports to South Africa since the close of the Boer war and the increase in the proportion that goes to England. Quebec, Ontario and the Northwest Provinces of the Dominion of Canada have always taken a good proportion of the direct exports from this port. But of late years the proportion which goes to England has been rapidly increasing. The following table shows the changes:

	Quebec, Ontario, etc.	England.
1903	$16,766,488	$4,596,464
1904	16,493,434	5,261,619
1905	18,032,447	11,777,885
1906	20,823,343	13,378,049

In considering Detroit's export trade it should always be borne in mind that the Government statistical tables indicate the point of departure of merchandise sent abroad and not the point at which it originates. Detroit's location with reference alike to its own country and to Canada, and the character of its manufactures, tends to an especially distinct separation of these two classes. Many of its heaviest exports come from farther west and south, while most of its own manufactures make their way to foreign markets through Atlantic and Pacific seaboard ports.

The export tables show some curiosities in the currents of trade and transportation. Michigan is a wool growing State and raises not a pound of cotton. Detroit has no cotton exchange and among its business men there is not a single cotton broker. Yet after New York and Boston it is one of the leading cities of the North in the volume of its cotton exports. Last year it sent abroad 43,000,000 pounds of raw cotton and not a pound of raw wool. This is because its southwestern railroad connections make it the natural point of departure for that portion of the Arkansas and Texas cotton crop which is destined for Canadian mills. This is also the crossing point for much larger quantities of cotton which go through Canada in bond on their way to eastern New York and New England towns.

There are only a few small tobacco fields in Michigan, yet Detroit exports twice as much of that leaf as it does of vegetables. Michigan is one of the best apple growing States in the country, had in 1900 more peach trees than any other State except California and Oregon, and was fifth in its production of grapes. Yet Detroit's direct exports of apples in 1905 amounted to only seven barrels, worth $24, while of oranges it was the point of departure for over $60,000 worth. It exported more Canadian prunes, many times over, than it did Michigan plums, more raisins than grapes and more apricots than peaches. There are many other things in which production and export do not go hand in hand.

But if the direct exports from Detroit do not all originate here, an infinite variety of manufactured articles which do originate here enter into foreign trade without ever appearing upon the local custom house books. And these include some very bulky articles. Three or four of the largest dry kilns in Russia are of Detroit manufacture. Detroit-built cars roll over the railways of Canada, Mexico, Spain and Russia. The largest brewery in South Africa is fitted with Detroit-made tanks, and one of the largest mines is fitted with pumps and water valves of Detroit make. Although such a recent invention, Detroit-made automobiles are famous the world over and are traveling in pretty much every country that has passable roads, even to India, Burmah and Siam. Detroit-made agricultural implements go to a number of European countries, and Detroit furniture is making headway in the same markets. Detroit pianos and Detroit self-players are found in the homes of a number of European countries. Detroit planed hardwood flooring has quite an extensive foreign sale. In stoves and radiators there is so much weight to a given value that freight charges become an important consideration, yet these articles of Detroit make are sold in carload lots in England and on the Continent. Detroit-made adding machines, a very recent accession to the industries of the city, have a substantial reputation and are sold in almost every country that has any system of commercial accounts. Detroit manufactories originated ready mixed paints, and these now have a wide distribution over the world. Pharmaceutical preparations manufactured in Detroit go into every country whose people have physical ills to heal; heavy clothing to the Canadian lumber woods and mines; boots and shoes to Canada and the West Indies; toys to France and Germany; plumbers' supplies to Great Britain, to the Continent of Europe and to South America; picture frame moldings to Germany; grass and garden seeds to a number of countries. These are only a part of Detroit's additions to the great army of commercial invasion of foreign markets. In reference to the volume of this trade in these articles, it is impossible to obtain statistical approximations, for there are no books that show at once the place of origin, the point of departure from the country and the ultimate destination.

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STEEL PLANT, DETROIT.

It is a noticeable incident of the city's foreign trade that in speaking of foreign shipments Detroit manufacturers mention Australia, New Zealand and South Africa oftener than they do our next door neighbor, Mexico, where Eastern cities, New York, Boston, Philadelphia and Baltimore, seem to control the situation, due to steamship facilities.

Fruit, principally bananas, now represents 55 per cent. of Jamaica's exports.

Beginning September 25, the steamers of the North German Lloyd's East Asiatic mail steamship line, in addition to the other usual ports of call, also touch at Algiers on both outward and homeward voyages.

CEMENT VERSUS WOOD.

The use of cement for replacing articles made of wood is increasing every day. Cement has already replaced wood, to a great extent, in building sidewalks, bridges, fence posts, steps, building walls, foundations and many other purposes, and is commanding considerable attention at present in the form of shingles. In the earlier instances of concrete roofing the material was used in the same manner as in laying a floor, but the great strength required in a floor is not necessary in a roof.

The cement shingles are only a little heavier than the best wood shingles, and, as they are practically indestructible, they are cheaper in the end than any other material, including tile and slate. These shingles are made in a great variety of designs, and are reinforced with metal skeletons, which hold the cement together and terminate in loops at the edges for nailing to the roof.

They are practically everlasting, as moisture, the cause of universal decay, is the chemical agent in the process of hardening cement.

THE WORLD'S PRODUCTION OF COAL.

The world's production of coal in 1906 amounted to about 1,106,478,707 short tons, of which the United States produced 414,157,278 tons.

Since 1868, during a period of thirty-nine years, the percentage of the world's total coal produced by the United States has increased from 14.32 to 37, and this country now stands far in the lead of the world's coal producers. It has been only eight years since the United States supplanted Great Britain as the leading coal producer, yet the increase in this country has been so enormous that Great Britain can no longer be classed as a competitor. In 1906 the United States produced 43.7 per cent. more coal than Great Britain and 85 per cent. more than Germany. Exclusive of Great Britain the United States in 1906 produced more coal than all the other countries of the world combined.

It may also be noted that more than 96 per cent. of the world's production of coal is mined in countries lying north of the equator, the countries south of the line contributing less than 20,000,000 tons annually.

The days' runs of the "Lusitania" on her maiden trip were: 233, 556, 575, 570, 593 and 481 knots. She averaged 23.01 knots per hour for the entire distance of 2,782 nautical miles.

BOOTS AND SHOES IN EUROPE.

What Fifteen Years Has Seen in the Development of the European Vogue of the American Shoe—Successful Establishment of Retail Stores by Manufacturers.

BY AN OLD SHOE SALESMAN.

"AMERICAN girl, bet you a dollar," I remarked to my traveling companion. From the window of our railway carriage we could only see the feet of a young girl standing on a station platform somewhat higher than our level. That was in Denmark twelve or fourteen years ago, and the girl did in fact prove to be American. The American shoe branded an American wearer in those days. To-day the placard "American manufacture," or "echt Amerikanisch," labels many a sample displayed in shop windows in Great Britain, in Germany, in every country of Europe down to the Sultan's capital city. Wearers of American shoes are no longer Yankee tourists only. By their feet one can no longer know them. Fifteen years have wrought incredible changes in boot and shoe manufacturing in Europe and have contributed materially to the prosperity of not a few American makers who have studied European markets and worked intelligently to obtain and maintain a substantial footing here. Exports of American boots and shoes to Europe now equal in a single month those of a whole year a decade and a half ago.

It does not require a very old man to remember the days in our own country when the gilded youth sought out the bootmaker "late of London" to order his shoes made to measure, and when the fashionable American woman was by no means satisfied until she had equipped herself with shoes imported from Paris—or at least made of "French kid" and marked after the French style by American manufacturers. Who thinks of such a proceeding to-day? What American, traveling in England or in France, and in need of footwear, but inquires anxiously where American shoes may be bought? However, it is not they but the natives themselves who have made the success of the "American shoe stores" in Europe—stores that have prospered so well in the principal cities of Great Britain, France and Germany.

Perhaps the introduction of no other kind of goods from any foreign country ever made such a "row" and created so much excitement and opposition among local manufacturers as did the early sales of American shoes in Europe. I remember visiting Cologne, Germany, twelve years ago, while a convention of the boot and shoe manufacturers of the Rheinland was in progress. These manufacturers excitedly passed a set of angry resolutions calling upon the German government to increase German duties on American shoes so as to effectually bar them from the country. Then after adjournment half a dozen members of the convention visited my sample room—and two of them left orders with me! Their excitement and anxiety over the early introduction of a few American shoes seemed to me then quite inexplicable as well as unprecedented. Imports of American shoes into Germany could not at that time have amounted to more than, say, $25,000 a year. Italian, English and French boots and shoes were freely sold in Germany and had aroused no such opposition. As I look back upon it now I can see that the German manufacturers saw more clearly than I into the revolution in the trade that was portended. I was a firm believer in the value of our American "chrome" leather, then so new; I believed that English and German methods of manufacturing and marketing were a hundred years behind ours; but I did not then anticipate that American shoes would ever be more than an exotic in a strange land. I did not foresee that the time would come when American manufacturers would open their own retail shops throughout Europe and demonstrate practically to the European shopkeeper what stocks of goods ought to be carried and how customers should be fitted.

The opening of the first "American shoe store," properly so called, was due to a British manufacturer, and was so extraordinary a wonder that interest in it endured for several years. In inception and in managemen, however, this establishment was little more than an aggrandizement of the idea which had already been exemplified in Paris and in Dresden—a shop where American tourists and the considerable resident American "colony" might find shoes after their own ideas. Small wonder was it in the "old days" that the fastidious man or woman in Europe sought out a "bespoke" bootmaker where one could have made to measure footwear that would at least fit. The cavalier treatment given the customer in the ordinary British bootshop of years ago, and (be it ever so gently whispered) still given him in a large percentage of cases, is almost incredible to an American accustomed to large and varied stocks from which to choose, to polite and solicitous treatment, to a genuine desire on the part of the salespeople to fit the customer's foot perfectly. No British or European shoe manufacturers of fifteen years ago thought of such a thing as making half sizes. While American manufacturers were supplying their customers with six and seven different widths, the European maker was contented to make three "fittings" at most, and in but few retail shops were more than two to be found. If an 8 E was too short the clerk gave you a 9 E. These were too wide, but it was a case of "take 'em or leave 'em." There was nothing else to be had and only one shape of toe available at that. When we early birds in the flock of American shoe salesmen booked European orders, with more than half the customers no "half sizes" were wanted. It was in vain we preached the American theory, in vain we insisted that the supplanting of the "made to order" shoe, and the prosperity and development of ready-made shoe shops, depended upon the stocking of a sufficient variety of shapes, sizes and "fittings" to meet the requirements of the most exacting. The establishment by American manufacturers of their own retail shops in every great city in Europe, stocked, organized and managed as are similar shops in our own country, successfully competing on the ground with the older native shops, was primarily due to the conviction that such establishments and such methods would pay, as well as to the reluctance encountered on the part of the European dealer to push the profitable trade that began to develop for American styles. For the American "style" was universally commended on first sight, no matter whether practical demonstration only would remove the objection that they would not and could not "fit European feet."

In Great Britain there are now probably thirty exclusively American boot and shoe shops, established and maintained by American manufacturers, and possibly as many more where a specialty is made of one or more lines of American shoes. On the Continent there are very likely as many more, while the number of merchants who dabble in American shoes to some extent is legion. The advent of the strictly American shoe store has been signalized by other and notable departures from previously existing practice. Especially notable in the German capital, for instance, is the change effected in shop fronts and in window dressing, following the example set five or six years ago by the first American shoe store established there. The German shops today boast handsome fronts and creditable window displays, although up to a few years ago the old and atrociously ugly and unattractive customs prevailed. In England practice in this regard has changed more slowly, and one can still tell at a glance which shops are under American management and which are under British, no matter what the nationality of the wares displayed.

The European trade in American boots and shoes continues to grow, and this in spite of the fact that European manufacturing has been radically and thoroughly revolutionized by the complete assimilation of American ideas. American manufacturers of tanning machinery are actively engaged in introducing methods and apparatus to improve and Americanize European leather. American shoe manufacturing machinery is almost exclusively used in European factories. American styles are imitated to some extent by European manufacturers. But in spite of all the American made shoe continues its prosperous career. There is something about it that European factories fail to get, something that customers want and seek. An old resident of Berlin and a close student of affairs told me the other day that in his opinion there is room in that city for five or six more American shoe stores. There are three or four there already. One cannot, then, anticipate an early curtailment of our business in this line in Europe. On the other hand, so much of our present trade has come to us almost without solicitation that one marvels what the result may be with the increased effort and enterprise in these fields that our manufacturers are bound to bring to bear in the future.

THE ORIGIN OF FISHING REELS.

The origin of the fishing reel is shrouded in mystery. J. M. Clark, a veteran Kansas City angler who has given considerable study to the subject, says the fishing reel is at least 3,000 years old. A picture of that age representing a fisherman with a rod and reel is hanging in the gallery at Hong Kong, China, he says.

"The reel in the picture is described as being made of metal, probably bronze," said Mr. Clark. "It is large and cumbersome and is of the single action pattern."

A century or more ago reels made of wood were in use in England, Scotland and Wales. These reels were about five inches deep, the drums being, therefore, very large. They were used in salmon fishing. Subsequently manufacturers offered metal reels, but they were so large and cumbersome that it was not until many years after their first introduction and after their weight had been lessened that they came into general use. All of these reels were, of course, crude in construction and of the single winch pattern.

It was about sixty years ago that the first multiplying reel was introduced. It is said to have been the invention of two Kentucky watchmakers. These men first made double multipliers; that is, for each revolution of the handle there were two revolutions of the spool containing the line. Later these same men are credited with the invention of the quadruple multiplying reel, which takes up line four times as fast as the handle is turned. The inventors never applied for a patent. At present there are more than fifty firms in the United States manufacturing quadruple reels.

INDIAN TEA IN THE UNITED STATES.

An interesting statement relating to the growth in the consumption of Indian tea in the United States is made by Mr. Seymour Bell, British Commercial Agent, in a report to the Foreign Office. Mr. Bell states that there was a very satisfactory improvement in the quantity imported from the United Kingdom and the East Indies last year. Imports of tea from China and Japan declined by 10,500,000 pounds, but the receipts from the United Kingdom, British North America and the East Indies amounted to about 10,000,900 pounds, an increase of 2,750,000 pounds as compared with the year preceding. The representative appointed by the Ceylon Tea Planters' Association, who has his headquarters in New York, is reported to be doing good work, and the result is likely to be to increase the imports of Ceylon tea. There appears to be no doubt, according to Mr. Bell, that East Indian teas are increasing in popularity in the United States, and if the business is properly looked after it ought to show favorable results.

In a recent report on Japanese paper mills, Mr. Oswald White states that bamboo grass, although plentiful in Japan, has hitherto been little utilized.

INDUSTRIAL CUBA

Great Developments Under Way Throughout the Island—Improvements in Eastern Cuba—The Cuban Railway Systems.

BY HARVEY McKENZIE.

DESPITE the disturbing elements of political and labor troubles, Cuba today is a more important factor commercially and industrially than ever before. More than this, the promise held out by the immediate future is particularly bright. The "Pearl of the Antilles," with its wealth in hardwood, sugar, tobacco and coffee and minerals, is attracting more attention from capitalists than for many years past, and vast improvements and developments have been inaugurated in the last five years which are doing much for the future of the island's prosperity.

Cuba and the United States are so close that the commercial relations between them are naturally of great importance.

Commerce of the United States with Cuba in the fiscal year just ended was greater than in any earlier year of the trade relations between the United States and that island. This is particularly true of exports. The imports from the island fell slightly below those of 1905, due to the fall in the price of sugar, but the exports to the island were 25 per cent. greater than in 1905, 75 per cent. greater than in 1904, and about 120 per cent. greater than in 1903.

The growth in the exports to Cuba during recent years has been very rapid. The value of exports to that island had never reached the 20 million dollar line until the year 1893, when they were 24 millions. In 1894 they were 20 millions, then during the war period they dropped as low as 8¼ millions, but in 1900 again crossed the 20 million line, being in that year 26½ million dollars. In 1903 they again dropped to a little less than 22 millions; in 1904, 27 millions; in 1905, 38 millions, and in 1906, $47,763,688.

In imports the gain is less strongly marked. Prior to 1895 the value of the imports into the United States from Cuba ranged in most years from 50 to 75 million dollars, being in 1874 85 millions and in 1893 78 millions. The year 1905, however, made a record slightly higher than that of 1874, the total value of imports from Cuba in 1905 being $89,304,259. In 1906, the fiscal year just ended, the value of imports into the island was $84,979,831, a slight decrease as compared with 1905.

This fall in the value of imports from Cuba in 1906 was due solely to the fall in the price of sugar. The five articles forming the bulk of our imports from Cuba are sugar, tobacco, cigars and cigarettes, iron ore and bananas. Of these the most important by far is sugar, which amounted in value in 1906 to 60 million dollars; tobacco, 13½ millions; cigars and cigarettes, 4 millions; iron ore, 2 millions, and bananas, 1 million. Tobacco, cigars and cigarettes and iron ore show an increase in the fiscal year 1906, and bananas show a reduction of less than half a million dollars, while sugar shows a reduction of over 4 million dollars in value in 1906 as compared with 1905. The quantity of sugar in 1906 was, however, more than 33 per cent. in excess of that in 1905, being 2,781,901,380 pounds and the value $60,208,148, against 2,057,684,169 pounds, valued at $64,366,104, imported from the island in 1905.

PLAZA, MATANZAS.

The principal articles forming the nearly 48 million dollars' worth of merchandise exported to the island were iron and steel manufactures nearly 10 million dollars, against a little over 6 millions in 1905; flour over 3 million dollars, cattle about 2 millions, lard about 3 millions, other provisions about 3 millions, including milk valued at $665,277, lumber about 2½ millions, boots and shoes a little less than 2 millions, cotton goods 1½ millions, cars and carriages 1½ millions, and corn 1¼ million dollars.

The increase in shipments to Cuba, while visible in many articles, occurs chiefly in manufactures of iron and steel, of which the total exports to the island were $9,879,648 in 1906, against $6,164,908 in 1905.

Havana, the capital and chief city, is connected with the United States by direct and regular steamship service with New York, Key West, Galveston, New Orleans and Mobile. In addition there is regular steamship connection with Europe, Mexico and South America.

Santiago de Cuba, the second city of the island, is at present undergoing rapid development. The city is spreading rapidly, and new buildings, transit lines and other improvements are well under way. Santiago is to the south coast what Havana is to the north. It was only a few years ago that the only vessels entering the port of Santiago were sailing vessels and stray tramp steamers. This is all changed now, however, for three lines of steamers make the port from the United States, half a dozen from northern Europe and the Mediterranean ports, and two from the River Plate. In a period of three months during the present year the movements of vessels in the port amounted to 179 ocean steamers, 132 coasting steamers, and 183 sailing vessels.

The chief exports from Santiago are sugar, tobacco, cocoa, honey, lumber, coffee, iron and manganese ores.

The center of the greatest agricultural activity of the island is Cardenas. It is the largest alcohol producing center, and also has large sugar refining interests. The city is also destined to be the chief market for sisal hemp.

Cienfuegos is the largest shipping port for cane sugar, exporting last year more than $12,000,000 worth.

No review of industrial and commercial Cuba of today would be complete without particular mention of the development going on in eastern Cuba. The great richness of the valleys of eastern Cuba was for many years left undeveloped owing to their comparative inaccessibility. In more recent years, however, Cuban enterprise, backed by American capital capital, has taken up this part of the island, and, beginning with 1903, eastern Cuba has been opened to profitable exploitation. The Cuba Eastern Railroad

CUSTOM HOUSE PLAZA, HAVANA.

tapped the rich lumber tracts and fertile valleys; 500,000 feet of lumber is being shipped each month from this section; the forest-land when cleared of lumber is planted in sugar cane, and a vast sugar producing field is taking the place of the forest. New and large sugar mills are in operation to handle the increasing crop.

Nor is sugar the only product of eastern Cuba. Tobacco, coffee and cocoa are also being raised in large quantities.

Mention of the Eastern Cuba Railroad calls attention to Cuban railroads in general. Cuba has the honor of being the second country in America to build a steam railroad. The pioneer line on the island ran from Havana to Guines, a distance of some 45 miles, and was opened to traffic in 1837. Curiously enough this road was built eleven years before the mother country, Spain, had constructed one.

In recent years Cuba's railway mileage has increased with remarkably rapid strides, and at the present time there is a total trackage of some 2,500 kilometers.

The largest line is that of the Cuban Central Railways, whose system covers the province of Santa Clara. The most important commercially is the line from Cienfuegos to Santa Clara. The Cuban Central Railways serve three important ports, Cienfuegos, Ysabel de Sagua and Cabarien. At Cienfuegos, on the south coast, the railroad's steel pier is the finest on the island, and is capable of accommodating large vessels of ocean draft.

The United Railways of Havana radiate from the capital city to Matanzas, Cardenas, Cienfuegos and other important cities.

The Cuba Railroad is the largest single line on the island, reaching 354 miles from Santa Clara to Santiago. It has in addition a number of branch lines.

PANAMA CANAL PROGRESS.

THE making of the Panama Canal is the biggest task of the kind that man has ever attempted. It ranks with the most stupendous schemes that human energy and grit have ever put into effect. Bigger than the task itself is the result it will have on the world's commerce.

An industrial army, 30,000 strong, is now engaged in the arduous work of making the ship canal which will bring the Atlantic and the Pacific within a few hours' steaming of one another. The latest observers report splendid progress, and a conservative and unbiased prediction is that January 1, 1915, will see the canal open to navigation; $225,000,000 is a recent estimate of the total cost.

THE CANAL TASK.

The thing that overwhelms observers, when they first examine it, is the incomprehensible immensity of the entire proposition. It is 2,000 miles away from the Government that is building it; it is in a tropical country, little known; it is barren of supplies.

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IN THE CULEBRA CUT, PANAMA CANAL.

Literally, millions of dollars' worth of machinery have been necessary already for work on this great task. Over 200 locomotives, 2,000 cars for hauling dirt, 75 steam shovels, 300 drills—these are only some of the many items.

Back of the enterprise are the capital, energy and brains of a great nation. Despite the immense difficulties the work is progressing rapidly, work which is destined to unite the Atlantic and the Pacific, alter the commercial geography of the world, and bringing the family of nations into closer touch in every way.

As instancing the rapidity of the work, it is interesting to note that between 800,000 and 900,000 cubic yards are dug out each month. There are, approximately, 50,000,000 cubic yards yet to be taken out of the Culebra Cut alone, and an equal amount from all other places for all other purposes. At the rate now applying and in prospect, under present conditions, the cut will be ready to receive the waters of the canal inside of four and a half years.

The Culebra Cut includes the 9½ miles from Bas Obispo to Pedro Miguel and forms what might be termed the "canal proper." Of this distance, 1¼ miles will be 545 feet in width at the top of the water and 500 feet at the bottom; 4 miles will be 345 in width at the top and 300 feet at the bottom; and 4¼ miles will be 245 feet in width at the top and 200 at the bottom. The balance of the canal—37½ miles—will have a buoyed channel 1,000 feet in width at the narrowest places.

Everyone who has gone to the Isthmus since the United States acquired control of the Canal Zone has commented on the thousands of tons of French machinery lying rotting in the jungle along the line of the canal. The Americans have used some of this in filling excavations and in building dams.

Apparently some of the recent finds are being put to better use. The *Canal Record* gives an account showing how, by the expenditure of $20,000 for labor and material, an old French ladder or elevator dredge, which had been lying in the Rio Grande River, above La Boca, for more than twenty years, has been restored in every part so that it is now capable of excavating 120,000 cubic yards of material per month, an amount equivalent to that removed by four 95-ton 5-yard steam shovels. This dredge when in service at the La Boca entrance of the canal will do more work than a modern dipper dredge costing $102,500.

In reconstructing the dredge all the essential parts used were French. These were found in the jungle, or among other old French plants scattered along the line of the canal. The three boilers which have been installed in place of the two original ones were found in the jungle near San Pablo, where they had been lying for more than twenty years. They were in excellent condition, free from corrosion, and all bearings and fittings were in good working order. The two cylinders also came from the jungle, and were in like excellent condition. Their valves had to be reset and new rings fitted, otherwise they were in as good condition as when new. The engine, which had remained in the hull, was in excellent condition, and could not be surpassed by modern machinery, both as to adjustment and economy of operation. The copper piping on all the machinery is of very heavy design, and shows much more careful workmanship than is found in modern machinery. The remarkable preservation of this amchinery was due in the first place to the high quality of material used in construction, and in the second place to the use of white lead and grease, which covered the parts and excluded the air.

The British Consul at Christiania reports that the Hamburg-American line intends to start a new service, from Stettin to New York via Copenhagen and Christiania.

JAPANESE ENTERTAINED.

Kikujiro Ishii, head of the Bureau of Commerce of Japan, was entertained by American financiers at the Lawyers' Club, New York city, on October 11.

Chozo Koiche, Consul-General of Japan at New York, was the host at the luncheon. His guests were Americans and Japanese of prominence in the commercial district. E. H. Harriman, who was one of those invited, sent his regrets. Those who were present were: Jacob H. Schiff, Leslie M. Shaw, Frank A. Vanderlip, Dr. Jokichi Takamine, Franklin Allen, secretary of the American Silk Association; John Foord, of the American Asiatic Association; S. F. Morse, of the American Trading Company; K. Imanishi, of the Yokohama Specie Bank; Y. Ono, of the Bank of Japan; K. Fukuri, of Mitsui & Co.; S. Mitsui, E. L. Young, of Tokada & Co.; T. Matsuda and Y. Murai.

In introducing the guest of the day, Consul-General Koiche referred to him as one who had been making a special study of difficult problems for the benefit of his Government, and who had endeavored to see conditions in the West with the most optimistic spirit. Mr. Ishii had nothing to report to his Government, said the Consul-General, that would bear out in any degree the jingo apprehension of further trouble between the two countries.

Mr. Ishii replied in English. His brief address embodied the only official statement of his mission that he cared to give to New Yorkers, he said. He would speak plainly.

"I have made an extensive tour through the United States," he said, "and I have come through it with a thoroughly optimistic idea. I have everywhere been assured by American gentlemen that the Japanese people are quite welcome in this country, and almost everywhere I have witnessed the most cordial relations between Americans and my countrymen.

"I have come to the conclusion that where there is no conflict of interests between the Japanese in this country and the Americans, the two peoples ought to grow closer in friendship and cordiality, however hard some of the hoodlum element have tried to stir up trouble. It seems to me that the skill and diligence of the Japanese are peculiarly well suited to go along side by side with the capital, the influence and the enterprise of you Americans. For that reason I feel so thoroughly optimistic for the future."

On the same day Elbert H. Gary, chairman of the board of directors of the United States Steel Corporation, gave a luncheon at the Lawyers' Club in honor of Baron S. Mitsui, head of the great Mitsui Company of Japan, and accredited the wealthiest man in the empire. Judge Gary said after the luncheon that if any business affairs had been discussed he did not care to speak about them. Other directors of the steel company and representatives of its export department acted with Judge Gary as the hosts.

PROBLEMS IN COOPERAGE SUPPLY.

Industry Shifting Southward, Due to Decrease of Elm—The Slack Barrel an Important Factor in Many Industries.

ONE of the most common articles in everyday use is the barrel. To the average man a barrel is simply a barrel and he seldom thinks of the important part it plays in many American industries. He never stops to think how seriously trade would be handicapped if the barrel supply were suddenly to give out or if some individual or corporation succeeded in cornering the barrel market. Neither of these things is likely, but a moment's thought on either will serve to convince one that the homely barrel is a more important factor in industry than it is thought to be.

Courtesy of J. R. Melcher.

PANORAMIC VIEW OF STAVE FACTORY, CONTRASTING MODERN METHOD

This is particularly true of the "slack" barrel. In the cooperage trade barrels are commonly classified as "tight" and "slack." The slack barrel is used to hold commodities which are not liquid, such as lime, salt, cement, flour, sugar, vegetables, and a great many other articles. In many respects the slack barrel is an ideal container for such material. It is strong, durable, and easily handled. The articles which it contains are thoroughly protected, and after being once used the barrel may be again used and re-used for many different purposes, and after having served its time as container it has a final use as firewood.

Some of the commodities which were once almost entirely packed and shipped in barrels are now being handled in sacks, but the users of the barrel insist with much reason that the barrel has no superior. It is the strongest package on the market, is sanitary, and is easy to handle. A sack, on the other hand, is often damaged in transit, and when it contains food stuffs the material is likely to be contaminated. This contamination arises not only from unclean cars but also from the products coming in contact with other articles which seriously affect them. Protection against damage by moisture is often especially important.

There is a lively contest between the makers of barrels and the makers of sacks to secure the trade of sugar, flour and cement manufacturers, whose products were once chiefly put up in barrels and which are now extensively put on the market in sacks. The sack, of course, is a cheaper package, and the increasing scarcity of timber and the rise in price make the situation doubly difficult for the manufacturer of slack cooperage stock.

The ordinary slack barrel consists of some sixteen or seventeen staves, two heads of three pieces each, and half a dozen hoops. No complete statistics are available upon the amount of timber annually used in the manufacture of slack cooperage, but reports indicate that last year there were produced over a billion staves, over 200,000,000 sets of heading, and more than 300,000,000 million hoops. Many wire hoops are also used. It is probably safe to say that altogether more than 800,000,000 board feet of timber are used annually in the manufacture of slack barrels in the United States, and that if the barrels which are made in a single year were stood on end side by side they would cover an area of over 80,000 acres.

Because of its great strength and toughness, elm has long been the principal wood used for staves for high class barrels and for hoops, and it will be the favorite until the supply is exhausted. There has been a very great increase in the use of gumwood for staves within the last few years. Basswood has always been the preferred wood for heading because of its soft, even grain, but it, too, is being gradually replaced by gumwood.

The production of elm lumber in the United States has decreased over 50 per cent. in the last seven years. Elm is cut most largely in the Northern States and particularly in Wisconsin, Indiana and Michigan, and the exhaustion of the supply in those States has had a marked effect upon the slack cooperage industry.

OF TRANSPORTING WOOD TO FACTORY, BY RAIL, WITH OLD FASHIONED METHOD, BY CARTS.

One of the prominent manufacturers estimates that there are not half the staves made in Michigan now that there were ten years ago. Saginaw, which used to be the principal home of the industry, is now producing stock only in a small way, and, as a matter of fact most of the cooperage stock made in Michigan now comes from the Northern Peninsula instead of from the Southern Peninsula, as was formerly the case. It is the opinion of one of the best informed and most prominent manufacturers in Ohio that to-day there are not 1,000 staves produced in that State where there were 10,000 staves made ten years ago.

Red gum grows most abundantly in Arkansas, Missouri, Mississippi and Tennessee, and with the increased use of this and other Southern woods in the manufacture of slack cooperage the industry is shifting southward at a rapid rate. It is said that there are now a score of first-class plants making staves and heading in Louisiana where there was only one of any large capacity ten years ago. It will be only a few years, however, until the maximum output of these States is reached, and there, too, the manufacturers will be compelled by the scarcity of material to hunt vigorously for a supply of timber.

So far, forest utilization in the United States has been of the most wasteful kind, and only a relatively small percentage of the actual wood content of our trees has finally reached the consumer in the form of some useful article, whether that be board or stave or shingle. Studies made by the Forest Service of the Department of Agriculture indicate that in the manufacture of staves and hoops only 50 to 60 per cent. of the contents of the log which goes to the mill finally emerge in the manufactured form, and that, with heading, perhaps no more than 25 per cent. of the actual volume of the log finally goes into barrel heads.

Much of this lack of utilization cannot be prevented, yet there are possibilities of greater economy than is commonly practiced. For instance, upon careless inspection, logs are often assumed to be suitable for stave bolts and are cut into lengths which are multiples of 32 inches, and are subsequently found to be fit only for heading, which requires 21-inch lengths. This causes much waste which could have been prevented by a more careful determination at first of the purpose which the log was best fitted to serve. It is interesting to note that at an immense sawmill which is being erected now in Louisiana logs the full length of the tree will be brought in from the woods and cut into suitable lengths.

A GLIMPSE OF GERMANY.

Influence of Military Training on Industrial and Commercial Life—Great Prosperity Evident, Yet Inadequate Tax Revenues and Consequent Rise in Prices.

BY B. OLNEY HOUGH,

Editor American Exporter.

Berlin, September 3, 1907.

"GERMANY would get good value for all the cost of compulsory (military) service, though she should never have to fire another shot against a foreign foe." The words are those of an American professor, Dr. Howard, in his essay on "The Cause and Extent of the Recent Industrial Progress of Germany," a new and noteworthy addition to serious studies on this subject. "Patient toil, endurance and obedience are the qualities fostered in the army and utilized in industry," says Dr. Howard. The causes for German success he attributes mainly to method, education, training, discipline, good laws efficiently administered, the systematic enterprise of the employers and the sturdy perseverance of an "industrious, docile and intelligent proletariat." The well-being, good order and material prosperity of the German "masses," he rightly observes, are striking, for there are no slums in Berlin comparable to those of New York and London. Ranking military training first as making the German workman what he is, Dr. Howard counts as the other great factor in German success the application of scientific method to practical affairs. Things are thought out systematically. Employers encourage scientific research and use it. Lacking the initiative of the Anglo-Saxon and the quickness and artistic instinct of the Latin races, they pay more attention to careful preparation, to the elaboration of technical processes, to scientific equipment; in fact, to education in its largest and widest sense. Something of the individuality and the energy of the Anglo-Saxon is probably extinguished, but in these days it is the social or corporate unit that counts, and the capacity for combined and organized action is of the highest value.

BERLIN.

I have ventured to condense so much from this studious and valuable addition to the literature on a problem that today challenges the attention and the admiration of the whole world, because the conclusions arrived at are particularly impressive to the traveler who reads them when on the ground, bent on investigating commercial conditions. While talking a few days ago with the manager of an American factory established in Frankfort, excited language from without penetrated the thin partitions of the private office. "That's the way you've got to treat these fellows," said the manager with a smile. "They're used to military discipline. Treat them as you would, as you must, an American workman, and they'll take all sorts of advantage of you." Three days ago a large German merchant said to me, "We've studied trade problems, and how to build up our business, because we've had to study them to keep our heads above water. We've gone to the bottom of things. To-day we challenge the world in most trades, we beat the world in some. An examination of our school systems and courses stuns the foreigner. After serving their apprenticeship at home our young men have years of experience abroad, and when they return it is with practical knowledge and training of inestimable value."

Watching the Kaiser ride down Friedrich Strasse yesterday at the head of his gorgeous troops after a spectacular review of the Guards in the presence of visiting foreign military delegations, one could not but reflect that the reign of Wilhelm II, whom we think of as still a young man, has covered almost two-thirds of German industrial progress. For industrial Germany is only some thirty years old. Perhaps, without even excepting Japan, no nation has ever developed commercially more rapidly. A hundred years ago the country was divided among scores of small, weak states. To-day she is not only one of the most powerful of empires but every merchant and manufacturer keenly realizes what she is commercially. Great Britain, the United States, France, Belgium were almost full grown, industrially, before Germany even joined the race. All credit and honor be given her, and small wonder it is that the German is proud of himself and of his country.

Latent in the German character must always have been the innate capacity for accomplishing these wonders. The country of "peasants and handicraftsmen, thinkers and poets" of a hundred years ago surely owes its present industrial and political importance to something more than mere imitative ability. I am reminded of an old gentleman in whose company I crossed the Atlantic two years ago, whose young manhood was spent in the Fatherland, his prime in England, while his declining years are still devoted to active business interests in the United States. The old gentleman vehemently insisted that the inspiration of modern German industrialism is directly due and traceable to the thousands of young Germans who took refuge in England to escape army service during the Franco-German war. These young men, he contended, brought back with them, as they returned after the conclusion of peace, the ideas and the training imbibed in the English factories where they had been supporting themselves. Numbering, according to the old gentleman's estimate, not less than 25,000, and probably many more, their influence speedily made itself felt at home. I dare say that this idea has been advanced by others also, but to those more competent than I must its consideration be left.

Military training may contribute, as Dr. Howard asserts, to "patient toil and obedience," but it by no means obviates the strike. Employers of German labor tell me that the men's demands are growing constantly more insistent and more irrational. Socialistic tendencies are observable in demands such as that at a certain age every man shall receive a specified uniform wage irrespective of individual ability. But the "lockout" also is not unknown in Germany, and more and more manufacturers here are banding together in associations or tacit agreements to withstand labor demands.

The existing dissatisfaction with wages is easily comprehensible. Within ten years the cost of food-stuffs has advanced 33⅓ per cent., some people say 50 per cent., while rents and other living expenses have gone up in similar ratios. The taxation imposed a year or more ago continues to arouse great discontent, and if German Colonial policy is to be saved at all it will be through the practical business genius of Bernhard Dernburg, the Colonial Minister, himself an example of the German industrial system, for he passed a part of his novitiate in a New York banking house.

Even the present heavy taxation is insufficient, and it is asserted that the Government will surely and certainly face a deficit at the end of the year which will demand fresh imposts of one sort or another. Almost everything is taxed already, but the revenues derived do not equal expectations. For example, railway tickets are taxed. Rates have been seriously advanced, round-trip reductions abolished and all free baggage allowance withdrawn. To go from Berlin to Frankfort and back even without a pound of baggage now costs $4 more than it did a year ago. But the Germans, in consequence, are not traveling so much, and when forced to travel the man who used to take a second-class ticket now goes third. At the cheapest of the great restaurants of Berlin portions that used to cost 65 pfennig were advanced to 80, and more recently to 85 pfennig. The minimum cab fare in Berlin has been advanced from 50 to 70 pfennig. These instances illustrate the increased cost of living in Germany, which most observers unite in declaring must still further be advanced, and will inevitably result within the next few years in serious increases in wages.

The trust is not, as many people seem to suppose, exclusively an American institution. They have them in Germany, and at least one that in magnitude and power approaches our biggest. Investigations, too, are not unknown here, although I am told that there exist no provisions in the German laws which can be stretched to apply to them; and the story goes (I give it for what it is worth) that one investigation recently resulted in a declaration that the trust was a very good thing for the country. This is purely gossip; I have asked no serious questions on the subject. But even the Kaiser himself has to pay the established price for his winter's supply of coal—a fact that has caused some comment.

The occasional traveler who revisits Germany after an absence of six or eight years cannot fail to be impressed with the marked evidences of prosperity on every side. The great cities have been and are expanding rapidly, and the increase in wealth must be enormous, to judge from the growth of luxury observable in the shops and in the elegance of the new private and public buildings. The daily press of the whole world has commented on the "tightness" of the money market here, as in England and the United States, and pessimists are not lacking who view the situation in Germany with alarm. Certain it is that collections in Germany are just now almost impossible; creditors are obliged to favor debtors even of the highest standing. The situation here is attributed to precisely the same causes as govern with us.

"Berlin is growing like a mushroom town in Western America," remarked the American Consul-General soon after my arrival here. One or two visits to the new residential districts amply justified this statement.

American business in Germany? Never so prosperous or more promising is the report that reaches me from all quarters. Germany is manufacturing leather, boots and shoes, machine tools, hardware; is doing all of them well, yet in spite of that fact American business in all of these lines is larger this year than ever before. American quality is appreciated in Germany, and in spite of tariff changes that may affect unfavorably a few of our manufactured goods the future for our wares in general seems to be very bright.

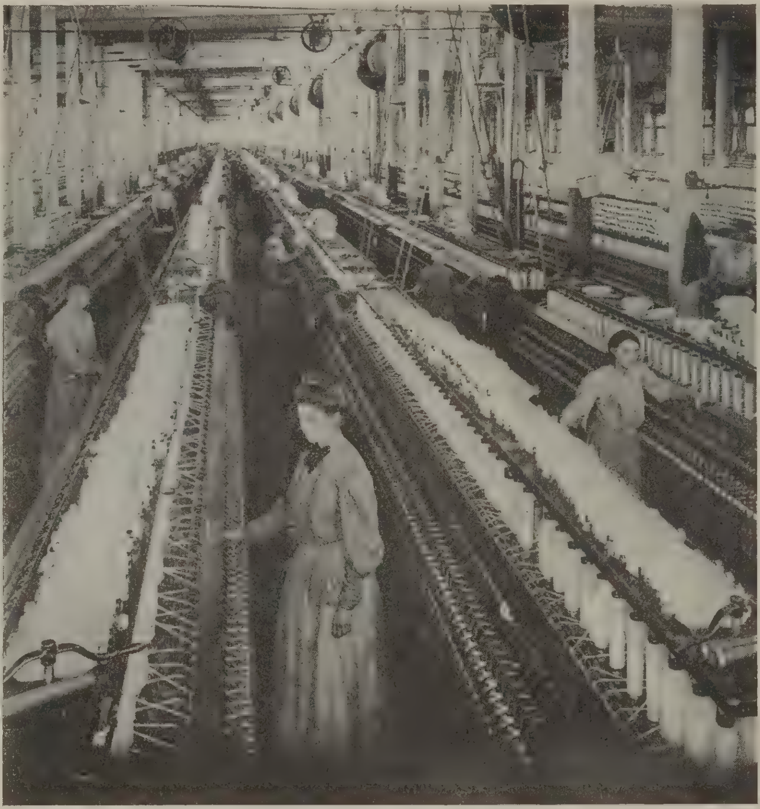
In the United States during 1905 there were 2,534,830 acres of flax under cultivation—an increase of 271,271 acres over the previous year. Almost all the flax on this area was raised simply for the seed which was used in the manufacture of linseed oil. The stalks, with all their possibilities of use as fibre material, were burned.

COTTON GOODS IN THE FAR EAST.

Railroads Co-operate to Move Export Shipments Rapidly—Growth of Manchurian Imports—Prosperity of the Textile Trade.

AS an instance of the advantage possessed by textile mills in the New England circuit, the facts relative to export transportation can profitably be studied. An analysis of the report of the Government's special textile agents regarding Asiatic markets discloses many facts affecting the cotton goods trade.

It is estimated that between 70 and 80 per cent. of the cotton fabrics sent to China by the United States are manufactured by Southern mills and that the remaining 20 to 30 per cent. are made by New England mills. During a recent tour of Southern cotton mill centers much dissatisfaction was heard at the difference in the prevailing rates on cotton goods between New England and Southern points and Shanghai. They now stand from New England to Shanghai overland, via a Pacific port, at 85 cents per 100 pounds; from Southern points to the same destination, by the same route, $1.25 per 100 pounds. In view of the advance in the Southern rate last year from $1.10 to the present charge, it is contended by the Southern manufacturers that they are being forced to pay an unreasonably high price for transportation. It is pointed out by them that a New England shipment via overland railroad to the Pacific might be, and at times is, so routed as to pass through Southern mill towns where a car containing like products of Southern origin would go forward by the same train, paying for about a 900-mile shorter haul over 40 per cent. more for transportation.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SPINNING ROOM, WHERE COTTON IS RUN ON TO 60,000 SPINDLES.

All cotton goods are sold on the basis of New York delivery. For this reason it is seldom that cloths of Southern origin are sent via the Suez Canal route. Complaint gives place to commendation when the shortening of the time taken in transit is mentioned. It is not so long since a most serious obstacle to growth in our Oriental commerce was the long period taken in transit and the impossibility of predicting with any reasonable degree of certainty when any shipment of merchandise would reach its trans-Pacific destination.

This has all been changed, following the individual activity of the Western railroads in attempts to secure as large a proportion as possible of this important business. The New York buyer of cloth for China specifies the route it shall take, therefore each Western freight agent in that city impresses upon his transportation department the importance of not only expediting consignments of cotton products, but in so far as possible an effort is made to send them through on a regular schedule. At least one Southern railway has adopted the plan of marking each car containing cotton cloth or yarns with a placard reading "Cotton Factory Products," and instructing its employees to push forward cars so designated with all possible dispatch. The factory representatives, working with the local freight agents, "trace" such cars assiduously, and the Western roads, realizing that quick and regular delivery is the principal advantage they can offer, rates being equal by all routes, strive strenuously for speed and regularity.

Manchuria is rapidly becoming an excellent market for American cotton goods. In 1903 imports in this class of goods advanced from $4,634,300 to $4,355,807 in 1904, and $9,246,484 in 1905. In the one item of sheeting the United States was represented in 1905 by sales aggregating $5,677,805.

The imports of American, British, Chinese and Japanese cotton cloth into Niuchwang amounted to $5,107,190 in 1899, $9,762,017 in 1903, and $17,763,974 in 1905, of the amount the United States selling more than

$9,000,000 worth during the last year. It is apparent, therefore, that the United States was not alone in increasing its import, inasmuch as a total value of $7,644,080 of native (Chinese) cotton cloth found a market in Manchuria in 1905, as against $4,413,406 in 1903, and $616,841 in 1899, thus making a grand total for 1905, together with the imports from the British empire and Japan, of $107,763,974.

At present the United States leads in cotton sales because of the superior quality of its products, coupled with prudent management in marketing its goods. What participation it may seek or secure in the yarn trade of Manchuria remains for the future to develop.

Niuchwang being one of the ports of the world of much importance to manufacturers of cotton goods, the question is frequently asked by what methods such products first entered this market. It is said by pioneer foreigners that when English manufacturers controlled the trade 30 years ago a very cheap Manchester cloth was on the market. It was flimsy of texture and stiffened with sizing to give it an attractive appearance. Some of this class of goods was much damaged in transit and was disappointing to consumers. The American cloth, on the other hand, was just what the Manchurian farmer wanted, and has since found ready sale there.

Chinese "flowery flag cotton," or the cotton of the Stars and Stripes, sells on its merits and will continue to do so if unhampered with restricting influences, such as the boycott, or until the native is convinced that he can get better value for his hard-earned cash by purchasing elsewhere. Much of the American cloth sent into Manchuria is made into sails for boats plying on the Liao River.

Just at this time the Chinese are said to have their eyes wide open watching Japan and the United States in the matter of cotton manufacture. They have ample capital and are anxious to obtain simple devices for the manufacture of cotton goods and the spinning of cotton yarn.

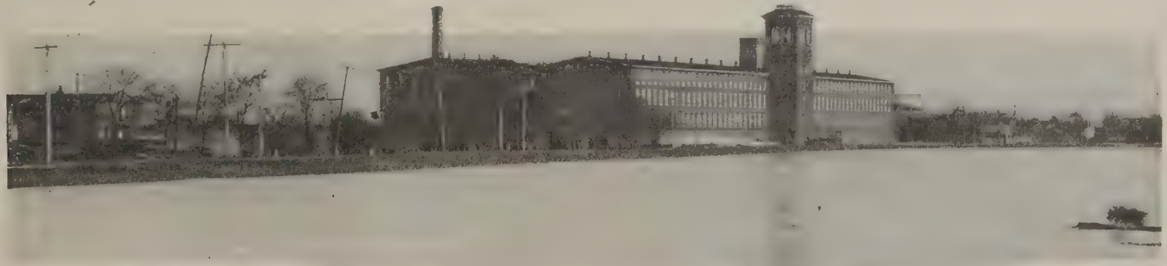
An experimental cotton yarn spinning plant is to be installed in Niuchwang, and if it meets with success the venture will be undertaken by others throughout that part of the world. It is not thought, however, that even the establishment of spinning mills in Niuchwang will change present trade conditions to any extent.

The clothing of the people is now American as never before. This explains the enormous increase in the value of the woolen manufactures of Massachusetts from $67,599,000 in 1890 to $109,027,000 in 1905. Massachusetts woolen mills clothe more than one-fourth the entire country. In 1890 Pennsylvania led the country in this branch of manufacture. But Massachusetts now leads and that lead it materially increased in the five years between 1900 and 1905. Indeed, that State gained nearly $28,000,000 in that half decade. This was more than double the increase of Pennsylvania. Rhode Island is the third State in the industry, but her product is less than half that of Massachusetts. But even that is most creditable to the enterprise of her citizens. Only in carpets and rugs, made chiefly of the coarser wools, does Pennsylvania lead Massachusetts.

The total number of wage earners employed in this industry increased 13.1 per cent. between 1900 and 1905. This was a much larger increase than had taken place in the previous ten years. While the number of wage earners increased 13.1 per cent. the total amount of wages earned increased 22.2 per cent. About two-thirds of the wool consumed in American mills is of domestic production. The domestic production is, nevertheless, falling off, even though it has a stiffer tariff protection than New England mills regard as fitting.

Among the contributory causes for the advance of the textile trade within the past two decades credit must be given to the textile schools, from which the present generation of technically educated managers of plants have been graduated. The future development of the industry is to be greatly influenced by the work that the educated textile expert is to perform. In New England due regard has been paid to this and the schools in that territory are fully equipped to furnish the brains for the industry, so far as actual manufacturing is concerned.

The leading textile schools of New England are located in New Bedford, Mass.; Fall River, Mass., and Lowell, Mass. The Lowell Textile School was incorporated in 1895 and has been managed by a board of trustees under a special act of the commonwealth. The formal opening of the school was on February 1, 1907. At present it occupies a site on which buildings with a floor space of 130,000 square feet have been erected. The attendance of the day classes is considerably over six score, and the night classes are attended by upward of 200 pupils. The Fall River school was formally opened on October 14, 1899.



Copyright by Detroit Photographic Company. A SOUTHERN COTTON MILL.

BRAZIL'S TRADE LAST YEAR.

Brazil's complete trade reports for 1906 are at last at hand, showing a gratifying improvement in trade and commerce as compared with the previous year. The British Consul General at Rio de Janeiro says that the increase in foreign trade is accounted for mainly by large importations of building and railway material and fuel, and the increased exports in coffee. Although foreign trade was still restricted by heavy duties and protective tariffs, and taxation continued to counteract the beneficial effects of higher rates of exchange on prices, yet the more stable rates ruling during 1906 enabled merchants to transact business previously paralyzed by the uncertainty of the market.

Money became more free, through credit continued to be somewhat constricted. Fewer failures and fraudulent liquidations were recorded in 1906. A slight increase observable in production other than coffee in 1906 is no doubt undeveloped, and the existing protective policy does not favor its expansion. Its effect has been to increase the cost of living, and of course, consequently to raise the expense of labor and production generally.

IMPORT TRADE INCREASES.

There was a general increase in the import trade for the year 1906, the imports showing an increase over those of 1905 of £3,373,990 in merchandise and of £53,913 in specie, amounting in all to an increase of £3,427,903. More railway cars and wagons have been introduced, but whereas in 1905 this rolling stock came principally from the United Kingdom, in 1906 the bulk has been supplied from Belgium. Rails and accessories show an advance of 19,804 tons. In 1906, 95,244 tons were imported; of these 34,200 tons came from Germany, 26,300 tons from Belgium, 18,100 tons from the United Kingdom, 16,100 tons from the United States and some 40 tons from France.

The exports for 1906 represent the record amount of £53,022,230, and show an increase of £8,438,386 over those for 1905. Referring to the intervention of State aid and the creation of the valorization scheme, the action was brought about by the disproportion of supply to demand and the prospects of an excessive crop of June, 1907, which had caused prices to fall. Planters also suffered by the high rate of exchange and inability to reduce the cost of production. Coffee for export represents gold value, for which the planter receives currency, and the higher the rate of exchange the smaller number of milreis are received for the pound sterling.

These considerations led to the signing of the convention known as the Taubate agreement on February 26, 1906, and the subsequent completion of the coffee convention scheme, which came into force on December 1, 1906, in the State of Sao Paulo, and on January 1, 1907, in the States of Rio de Janeiro and Minas Geraes. Business in coffee was naturally affected during the period the scheme was under discussion, and much uneasiness was felt in the market as to the ultimate intentions of the Government.

HAS NOT KEPT UP PRICES.

When once the State of Sao Paulo decreed on September 26 that the convention would come into force on December 1, and an export tax of 3 francs gold per bag would be levied, there was a rush of coffee for export to avoid the tax. This convention has not, however, kept up prices, which have continued to fall in foreign markets.

Coffee represents over 50 per cent. of the whole export trade, and shows an increase of 3,145,139 bags and £6,194,792 value, or 28.8 per cent. increase in 1906, while rubber represents nearly 27 per cent. of the whole trade, and shows an increase of 15,702 tons, and a decrease of £1,050,307 value. The decrease is mostly in Seringa rubber. Other vegetable products amounted to £215,587 in 1906, which is an increase of £8,172 over those of 1905, or 3.9 per cent.

The percentage of exports shipped to the different countries was as follows: United States, 35 per cent.; Germany, 17½ per cent.; United Kingdom, 16 per cent.; France, 12½ per cent.; other countries, 19 per cent.

MERCANTILE STANDING.

American consuls constantly receive inquiries from business men in the United States concerning the financial standing of foreign individuals and firms. It is evident that this question is of serious concern to the foreign buyers. If the information requested is furnished it can only be done in the manner prescribed by the Consular Regulations of the United States, viz.:

"Consular officers are forbidden to allow the use of their names as references for business or other enterprises, and they are not authorized to report to private inquirers concerning the financial standing or commercial repute of business men or houses in their districts. They may, however, refer such inquiries to banks or other business agencies, if any that can answer them; or they may quote the ratings of local business agencies."

NEW BOOKS RECEIVED.

"THE FOOD AND DRUGS ACT, June 30, 1906," is a critical study of the United States pure food law, written from the standpoint of a lawyer. Its author, Arthur P. Greeley, is a member of the bar of the Supreme Court, and was formerly Assistant Commissioner of Patents, hence is well qualified to undertake work of the nature indicated by such chapter headings of the book under review as: Purpose and Scope of the Act, Procedure Under the Act, Articles to Which the Act Applies, Adulteration, Misbranding, Guaranty. The full text of the act is given and annotated, together with rules, decisions and official food standards. The work should be of practical value to manufacturers and dealers in food, drugs, medicines or liquors. John Byrne & Co., publishers, Washington, D. C. $1.50.

The revenue of British Columbia is 20 per cent. greater than last year. Arrangements have been made with the Salvation Army to bring over 1,000 immigrants.

WITH THE MANUFACTURERS.

Industrial Notes of Interest—Descriptions of Products Which Find a Ready Market Abroad.

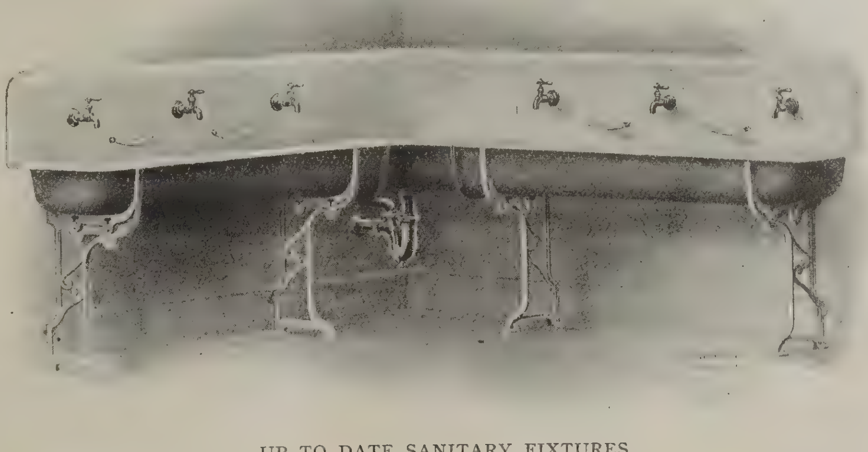
PITTSBURGH'S TRIUMPH IN SANITARY GOODS.

(From the *Pittsburgh Post.*)

The world is a very large proposition, but it is not too large to come, in one way or another, under the influence of Pittsburgh. If you stay right at home you must content yourself with a book or magazine knowledge of Pittsburgh's world-wide fame, but no matter where the Pittsburgher goes he will be able to establish home ties and connections.

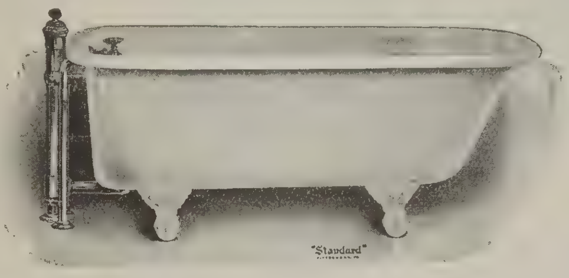
Are you going to make a tour of Europe and other foreign lands? Switzerland is in the itinerary? You want the best, so you stop at the St. Moritz Hotel, one of the largest and most up-to-date in all of the picturesque little republic. You can feel right at home in this Alpine resort, for after your day of Alp-climbing you return to your hotel and lose the soreness and dust of the climb in a snowy white bathtub, which is the exact mate of the one in your own bathroom, for if you would take the time to look you would discover that the baths in this famous hotel came all the way from Pittsburgh, having their origin in one of the immense factories which help give Pittsburgh fame.

Perhaps at the time that you are in Switzerland you have a friend traveling in the Far East—possibly in India. Your friend's experience will be similar to yours if, when in Bombay, he would stop at the Taj Mahal Palace Hotel. Its 400 rooms are furnished in the most elaborate manner—there are drawing rooms, smoking rooms, public and private dining rooms, electric lights and elevators and a refrigerating plant which keeps the rooms delightfully cool in the warm season. One of the striking features of the hotel is the public and private baths, which are very elaborate and complete, and it is very gratifying to note that all the snowy white plumbing fixtures are from Pittsburgh, the same as in the St. Moritz. Go from Bombay to Shanghai, China, and in the new Palace Hotel, in the latter city, you will find the same immaculate sanitary fixtures.



UP TO DATE SANITARY FIXTURES.

If in your travels you could get a glimpse into the Spanish monarch's room on the imperial yacht Alphonso XII you would see sparkling Pittsburgh sanitary ware. You would also find that King Alphonso had refurnished with the same make of goods the Pardo Palace, near Madrid, where the present Spanish Queen took up her abode prior to the wedding. In St. Petersburg, Russia, you would learn that when the Czarina erected the magnificent Imperial Maternity Institute at her own expense Pittsburgh furnished the sanitary equipment. The same Pittsburgh goods may be found in the great medical college at Odessa. If in the course of your travels you would have the privilege of visiting Buckingham Palace, London, the residence of King Edward, and Osborne House, Isle of Wight, residence of the late Queen Victoria, you would discover that royalty performs its ablutions in fixtures made by the same Pittsburgh firm that made your own.



MODERN TYPE OF BATHTUB.

The same holds true of residence of Lord Londonderry, residence of Lord Lamington, residence of Lord Harlech, residence of Mr. Wyndham, former Secretary of State for Ireland; residence of her Grace the Duchess of Manchester, London; Lady Conway, Lord Belper, Sir Edward Greene, Colonel Pearson, Lady Howard Vincent, Earl Fitzwilliam, Colonel Craddock, of the Grenadier Guards; Marquise De Val Dora, Major Walton, A. M. Wright, Lieutenant-Colonel Yorke, residence of Sir Robert Dalrymple, Balmoral Castle of King Edward of England; Quirinal (royal palace) of the King of Italy, yacht Trinacria, of the King of Italy, residence of Prince Constantin Alexandrowitch Gortchakoff, St. Petersburg; Vivian Pond, King's Lynn, Markee Castle, Weald Manor, palace of the King of Belgium, palace of Prince Albert of Belgium, Earl of Lauderdale and many others.

Other interesting London buildings equipped with Pittsburgh sanitary ware are the Royal Tollard Hotel, located in a commanding position on a new thoroughfare opened by the king in 1905. Close by are the British Museum and the famous Lincoln's Inn Fields, the Marlborough Chambers, one of the most prominent residential apartments in all London; the Scottish Provident Institution, of which the most prominent feature is the sanitary equipment.

The Charterhouse, London, is unique in its interest and its story is worth telling. It was founded in 1371 by Sir Thomas

Manney and the Bishop of Northburg, and was originally used as a Carthusian monastery. At its dissolution as a monastery it was given by Henry VIII to Sir Thomas Sutton, who in 1611 endowed it as a charity under the name of the Hospital of St. James. For a while, however, it was used as a school, and among the eminent persons who received educations there were Dr. Barrow, Judge Blackstone, Addison, Steele, John Wesley, Bishop Thirwall, George Grote, Thackeray, Sir Charles Eastlake. Naturally its mature age and associations rank it as one of London's landmarks and quite recently when some alterations were made the same Pittsburgh firm was called upon to supply the sanitary fixtures, thus uniting the ancient and the modern.

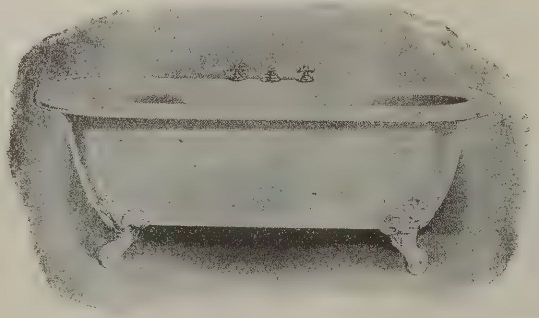
You can travel on through France, stop at the best hotels and find again and again, much to the delight of your civic pride, that Pittsburgh furnished the dainty fixtures called into use in performing your toilet.

'Tis the same in Havana, Cuba, if you reach that historic city in your travels. Read the inscription on the jacket of the motors that operate the trolley cars and you will see the name and trademark of a Pittsburgh manufacturer, and you may also feel sure that the rails over which your car runs so smoothly were made back home in the workshop of the world. Say what you will, it makes one feel a pardonable pride in their city when they see the impress of its enterprise and ingenuity stamped upon the life of the cities of foreign lands and their inhabitants.

The American Club in Havana is perhaps the most popular resort in the city for the American men of culture who reside there. Many of the wealthy Spanish and Cuban merchants are also members of this organization. Ex-President Palma was an active member when he held office. Its rooms are luxurious and complete to the smallest detail, and in every way its interior furnishing and equipment take rank with the representative clubs of our own cities. Even in the matter of gymnasium and bath accommodations does this club emulate our good example, and in this respect it is most complete. Pittsburgh baths, lavatories and shower apparatus were specified and installed in this building, so when the visitor from here is introduced and extended the courtesies of the American Club he can have his usual plunge in his usual style.

In Rio de Janeiro, Brazil, which is a favorite place with southern tourists, there is located a national hospital for the insane, which is beyond doubt one of the most complete institutions of its kind in the world.

It is interesting to note that here, too, where the best is always sought, Pittsburgh sanitary products have found favor. Much of the sanitary equipment of this institution is fitted with goods of Pittsburgh manufacture. The same is true of the Jornal de Commercio Building, and also St. Vincent's Hospital in far away Melbourne, Australia.



POPULAR STYLE BATHTUB.

Chapultepec Castle, the official residence of President Diaz, of Mexico, is another famous place where you may see evidence of the handiwork and craftsmanship of your townsmen, for in this famous old castle are to be found bathrooms fitted with Pittsburgh sanitary goods which are marvels of beauty and good taste.

And so it seems that, journey where you may in foreign climes, East or West, North or South, you will find Pittsburgh represented. In the workshops and mills of other countries our machinery hums by night and day; on the highways of the world our steel has revolutionized transit and construction; in the palaces of kings our bathtubs and lavatories gleam and glisten even as they do in our country and city. No other city in all the world is so well known by the spirit and push of her manufactures and the worldwide influence of her product.

One great Pittsburgh industry which deserves more than a passing amount of credit for what it has done to extend the name and fame of this workshop of the world is the Standard Sanitary Manufacturing Company, which furnished the sanitary equipment for all the buildings mentioned. It would be hard to believe that "Standard" plumbing fixtures are not well known to every Pittsburgher. This firm is by far the largest of its kind in the world, having factories in Allegheny, New Brighton, Louisville and Detroit, and selling connections throughout the United States and foreign countries. It has a force of 4,000 employees and is constantly increasing this number in order to meet the demand for "Standard" ware.

AGENTS WANTED.

The Breeze Carbureter Company is enlarging its business at a very rapid rate, securing responsible parties as agents throughout this country and abroad in most important population centers.

Jackson & McKinlay, of 16 Seaforth avenue, Toronto, Ont., Canada, and Mr. Thomas H. McNevin, 70 La Salle street, Chicago, Ill., are among those already interested. Their Eastern agents, the Breeze Carbureter Company of New York, 101 West Sixty-sixth street, New York, N. Y., carry nothing but Breeze carbureters and fuel strainers, and have been very successful in the sale of them through New York and New England.

If parties are looking for an exclusive line or a salable side line that will give them a good profit for each effort expended, they would do well to write to the Breeze Carbureter Company, of Newark, N. J., for terms.

ARMSTRONG BROTHERS' ADDITION.

Owing to the rapid increase of its business Armstrong Brothers Tool Company, of Chicago, Ill., has been compelled to make further additions to the large modern plant which it erected about two years ago. These consist of two buildings of steel and brick construction, one 50x105 feet, the other 40x105 feet, with brick smokestack 60 inches in diameter, 115 feet high. In these buildings the company is now installing a modern power plant of 300 horse power, consisting of two 150 horse power water tube boilers equipped with automatic stokers, direct connected engine and generator, etc., and an up-to-date drop forge department of large capacity with steam drop hammers of the latest improved design, and other high grade equipment, including a complete die shop with machine tools especially adapted to that important work.

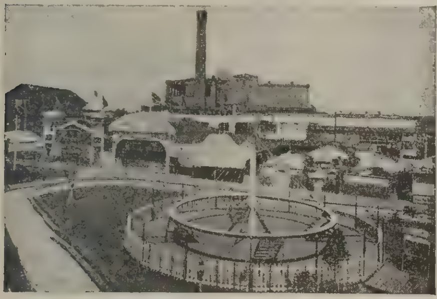
POSTAL INCIDENT.

An interesting thing in connection with the export trade of the Emerson Steam Pump Company came up recently.

A letter arrived perfectly addressed, originally, to them at Alexandria, Va., U. S. A., and mailed at Calcutta, India. A note, however, made on the envelope by the post office at Alexandria, Egypt, where it had been sent by mistake, was very forceful in its humor and brevity—"Try America."

The Emerson Steam Pump Company reports an unusually heavy foreign demand for its pumps, and is enthusiastic over the prospect of good sales from abroad for its Emerson and Emerson, Jr., pumps.

TESTPROOF ROOFING.



AMUSEMENT BUILDINGS AT HAVANA USING PAROID ROOFING.

Paroid roofing has stood the test of many years' use in all climates of the world. Under all circumstances and conditions it has proven its value. It is manufactured by one of the oldest and largest concerns in the world, the principals of which devote their time exclusively to the manufacture of the goods. Paroid sells itself. This careful, constant supervision by a man trained in the business since childhood assures the public of the absolute uniformity and durability of this famous roof covering. No chances of any defects are taken by the manufacturers. They are constantly striving for improvements. Unlike most other makers of roofing material, they produce at their own plants the basis of the roofing, which is a strong wool felt. This is all made under their own personal supervision, so that they know exactly what goes into the material. This felt is carefully prepared and then thoroughly saturated with the famous Parine composition, rendering every fibre of the felt absolutely impervious to moisture, the action of acid, alkaline and gaseous fumes, etc. In addition to this the saturation also greatly increases the strength of the felt and so protects and preserves it as to make rot or decay impossible. Then the smooth, even finishing coat is put on, which is made by a special process, again increasing the strength of the felt and thoroughly protecting the inner saturation, making it impossible for it to dry out, become hard or brittle. This outside coating has peculiar weather and sun resisting properties. It will not run under any heat, is a perfect non-conductor, consequently, contrary to general opinion, is the coolest roof covering made, making it especially valuable for use in tropical climates. It is an ideal covering for the siding of buildings, especially when fastened on with strips of half round moulding. It presents a most attractive appearance. If persons desire, after the Paroid has been on a few months, it can be painted with any first class oil paint, not because it needs it; purely for decorative purposes. Paroid roofing, laid with strips of half round moulding, properly decorated, makes indeed a very attractive appearance. It is put up in neat, compact rolls, all fixtures for applying inside. It is the acknowledged standard adopted by the United States Government. Handsome illustrated booklets showing government and other buildings in various parts of the world covered with Paroid will be cheerfully sent on application.

PAROID IN THE TROPICS.

The Paroid roofing is well and favorably known and very extensively used in South Africa, Australia, New Zealand, throughout all of South and Central America. Carload upon carload is shipped to Mexico. Enormous quantities of it go to Cuba and Porto Rico. The manufacturers state that the sun never sets on this famous roof covering, as it is used in all parts of the world. Prices, facts and all particulars, with Paroid proofs, will be sent anyone. Correspondence is conducted in all modern languages by the export agents, Frank S. De Ronde Company, 24-26 Stone street, New York City.

PAROID ROOFING ON A HONDURAS RUBBER PLANTATION.

THE PROBLEM OF VENTILATION.

To provide a healthful atmosphere under the congested conditions found in theatres, public buildings, and factories has been a difficult problem, the solution of which is found in the ever-increasing use of electricity. The same current so extensively employed for lighting can be made to operate a propeller fan, which, by continually substituting cool and pure air for that which is hot and vitiated, contributes to the comfort of those who labor as well as those assembled for amusement.

In the dyehouse, the laundry and the kitchen the electric propeller fan maintains an atmosphere free from steam, odors and overheated air. The more extensively this type of fan is used the more its convenience and simplicity of operation are appreciated.

The electric propeller fans manufactured by the B. F. Sturtevant Company have this season been notably modified and improved to embody the latest scientific ideas and the results of a careful study of conditions in actual practice. The entire apparatus is of unusually rugged construction to withstand the strains of transportation and installation, and to insure rigidity and long service even if subjected to rough usage. Combining the best mechanical and electrical details, the design is simple, so that repairs, if necessary, can be made at a minimum expense of time and money.

The combination consists of a propeller wheel and motor on the same shaft. Experience has shown that an open motor, although cheap, is a dust catcher and often a source of much trouble. Therefore Sturtevant propeller fans are driven by enclosed dust-proof motors of this firm's own manufacture. These fans are supplied in two speeds—"medium," for use in public buildings and elsewhere where absolute quiet must prevail, and "maximum," for other conditions, such as in industrial establishments or for greater resistance.

PHYSICIAN DISCUSSES AUTOMOBILES.

To the Editor.

In this enlightened day, when modern and labor-saving apparatus and contrivances are sought by every one, the progressive physician is either the owner of a motor car or realizes its importance in his practice and looks forward to the day when he can afford to gratify his desire, and not only realize greater comfort but find it possible to increase his income and handle a larger practice on account of the saving in time.

The manufacturers of motor cars appear to be fully alive to the fertile field represented by the doctors, but the majority of them are turning their eyes more in the direction of the city physician and specialist who can afford to gratify his dignity by purchasing a high-priced, high-powered and luxuriously appointed car. The country physician has nothing in common with cars of that type, and his wants are generally overlooked and his requirement for a cheaper car is neglected. There are two or three manufacturers, however, who appreciate the fact that there are twenty-five country doctors where there is one city doctor representing a prospective purchaser, and I have been fortunate in finding a car which seems to be admirably suited to my own purposes, and I am glad to tell my brother practitioners of my experience.

AN "ORIENT" IN AN AUTOMOBILE PARADE AT HONOLULU, H. I.

Based upon this personal experience, I am a strong advocate of the type of car representing a low cost combined with great durability, one representing economy in operation and up-keep. What the country doctor needs is a car that is free from complications and can be kept in general good order and efficiency by him during his few moments of leisure.

If it is true, as claimed, that a motor car depreciates 40 per cent. in value the first year and 20 per cent. each additional year thereafter, the doctor who practices medicine for a living will be decidedly out of pocket after a season or two with an expensive car and will be glad to reconsider his judgment and give more attention to economy.

I recognized at once that the car has not yet been built that will successfuly negotiate black mud and deep snow. Therefore, I decided that I wanted a car for rough and ready service at a minimum expense. Therefore, I invested $400 in a Waltham runabout of the type familiarly known as a "buckboard." I made this purchase two years ago and my subsequent experience has justified my choice. The expense of up-keep and repairs has been very small indeed, and has been represented by the purchase of two tires, a change of bearings, and some minor details, chiefly the result of my inexperience and tinkering with construction that I knew nothing about. The cost of these parts has been very small compared with similar parts of heavier cars.

I have operated my car night and day, summer and winter, and in all kinds of weather. I run it "wide open" and with a disregard to the character of the streets and roads that would ruin a more expensive car in short order. I have never been towed but once and that was when I was mired in the worst kind of mud in a place I should never have attempted. My car weighs less than 700 pounds and is almost as easy to handle as a light buggy. The distance one of these light-weight cars will run on a gallon of gasoline is simply remarkable. I do not know how much my gasoline bill has amounted to, but estimate that under ordinary road conditions I run from 15 to 25 miles to the gallon, and, inclusive of stops for teams, mud holes and other setbacks encountered on the road, I easily average 15 to 18 miles an hour. On my short trips of 10 miles or less I can pay all of my professional visits in less than half the time that I could do it with a horse and buggy.

My car originally was the single cylinder type, but I have recently equipped a double cylinder motor of twice the horsepower and can now go over the ground much more rapidly than heretofore, and can attend to my practice in about the same length of time that would be required by one of the high-priced, high-powered cars.

My car is the narrow tread, 42 inches, and this has been the subject of some discussion with my friends. I have reached the conclusion that no special tread is suitable for all roads. Within a mile I have realized the wide tread would be beneficial, and then met conditions that made me glad I had the narrow tread. I have negotiated every hill in my section and have traveled over all roads comfortably. Some of the roads I travel are very sandy, but they do not stop me. I attribute this to the friction transmission employed in my car, which permits of five speeds forward and two reverse. By means of this transmission I derive nearly double driving power on the lowest speed that would be possible to attain with a gear construction. It has another advantage, for there is no possibility of stripping gears through careless handling or unusual strains, for even at the worst the motor would be stalled and no damage result. My car, although a light-weight, is not at all noisy and is quite free from vibration.

I had one experience worthy of mention. While going at full speed I accidentally struck a large bridge timber that would have smashed a larger and heavier car. The only damage resulting from it was the breakage of front springs, which were replaced at a cost of $4.00. The light-weight cars represent a saving on tires in general wear and tear that must not be ignored.

So far my car has not been laid up during hot or cold weather, except for very deep mud or snow. Once a week I pay a boy 25 cents to clean up the brass and turn the hose on the car, and this seems to be sufficient to keep it in a very presentable appearance.

H. M. Ferguson, M. D.,
Morris, Ill.

SIDE SPRING BUCKBOARD.

The buckboards of Schubert Brothers Gear Company, of Oneida, N. Y., enjoy unusual popularity, and every advantageous feature known in this form of vehicle is said to be embodied in their construction.

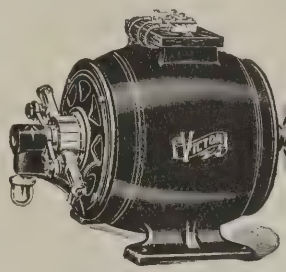
One of the latest designs is of the popular buckboard type of buggy. It is the product of one of the largest vehicle manufacturers in the country, whose experience in building carriages and wagons of every description extends over a period of nearly a quarter of a century. They have made an exhaustive study of the needs of all vehicle users, and their various products have by their excellence become known and adopted in all parts of the world. It is fitted with a wood dash and has full nickel body and dash rail. The body is made round at the rear end, and in the way of trimmings the choice of several materials may be had.

The vehicle is hung on side springs 61 inches long, which makes it very easy riding. This is only one of the many styles manufactured by this company. Its line includes all kinds of buggies, bike wagons, buckboards, etc., and it makes a specialty of designing and manufacturing high grade vehicles in the white.

TRIUMPHS OF ELECTRICITY.

The special adaptations of the small electric motor are many and varied, and in whatever field this subject has received due attention the advance on the old methods has been almost revolutionary.

The doctor, the dentist, the jeweler, the hotel man and the automobile owner will each find something that will increase their effectiveness and put money in their pockets. Wherever the electric current is available for lighting purposes it may be utilized to advantage to supersede cumbrous and old-time methods of handling problems, and it is the progressive man who looks into these advanced and time saving propositions. The individual does this for his own benefit, and the enlightened agent and dealer should be quick to realize the advantage of familiarizing himself with such apparatus, and should push it to the mutual advantage of himself and his customers.



The Victor Electric Company, of Chicago, has made a specialty for a number of years of just such apparatus. The successes that it has evolved are remarkable.

An interesting phase of our modern life is the increasing and varied rôle played by compressed air. It is used in the dentist's office and in the office of the physician. In our automobiles and bicycles we literally "ride on air" compressed in the tires, and in our big factories and power houses and machine shops it furnishes the most efficient method of removing dust, dirt, filings and chips from the windings of the big motors and dynamos. Then there are the long list of pneumatic tools and the more expensive industrial and engineering uses of this useful agent. A small electric motor is designed for use in manipulating compressed air.

Another adaptation of the small motor is in the motor lathes, comprising specially designed small motors with thrust bearings and variable speed, and fitted at both ends of the motor shaft with attachments for all buffing, polishing, grinding and drilling. This eliminates the necessity of using separate lathes or polishing heads, is more effective and efficient, and does away with all belts, making a light and portable outfit which is absolutely dust-proof, has no exposed wires and can be attached to the nearest electric socket. These machines find an especially ready sale for the work bench of the jeweler and the laboratory of the dentist. If work cannot be brought to the machine, the machine can be taken to the work. By attaching a flexible shaft to the motor and mounting polishing tools on the end of this, the workman can now reach anything in any position within a radius of several feet of the motor. A step further, equip the motor with a carrying strap to sling over a man's shoulder, and using a 20 foot flexible cord to connect the motor with the nearest electric light socket, one has a portable outfit that will enable the workman to reach all work in every part of the establishment. The garage owner can clean and polish every part of his automobile; the central station man can keep all his switches clean, and metal fixtures and signs can be kept bright at the store or in the hotel at a minimum of expense.

Mechanical vibratory massage applied to the human body has long since proven its value as a therapeutic agent. The equipment of a hospital or physician's office is not now considered complete without an apparatus for this purpose, and an instrument will be found in every first class barber shop and "beauty parlor." For the driving and regulating of these instruments electricity furnishes the ideal power.

In the dental engine (so much dreaded by the patient in the dentist's chair) the operator works with his drills, burs and grinders at the end of a flexible shaft, usually driven by foot power. If electric current is available he can attach the end of this shaft to a specially designed small electric motor, properly balanced and suspended and run from the nearest electric light socket. He can also install a special regulator to be worked by the dentist's foot, and he can then start it or stop it instantly at six different speeds, both forward and reverse, and all by a turn of the foot, leaving both hands free for skillful manipulation of the cutting tools, and none of his energy or attention is absorbed by the laborious foot-driven machine. Thus with electricity doing the work the dreaded engine becomes a blessing in disguise, saving time, pain and money, and adding to the reputation of the operator.

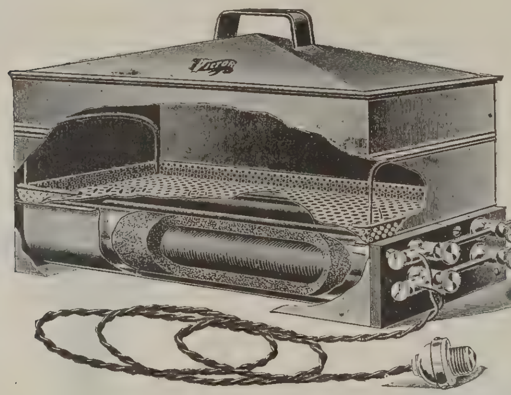
All these special adaptations and more have been carefully worked out and tested through many years by the Victor Electric Company, and many of their small motors and transformers have been sold separately to those who are looking for machines of a more elaborate design and finish than is found in the ordinary commercial apparatus. But the special field of this firm has been along the line of electro-surgical apparatus, some of which is especially interesting. The first is an electric sterilizer. At the present day, when so much is known about germs and bacteria, the surgeon sterilizes all his instruments most carefully before using them, and the dental profession is fast appreciating the wisdom of following the same course. For this purpose boiling in water is the method most often used, and this has been done in the operating room with some kind of a gas appliance, with its burners, gas pipes and flame. Far neater, more convenient and portable is the apparatus that attaches by a flexible cord to the nearest electric light socket, with no flames, tube or pipes, yet the amount of heat is regulated perfectly, and started and stopped by merely turning a switch.

Another interesting instrument is the galvano-cautery. This consists of a platinum knife or electrode, which is heated white hot by the electric current and kept so while the knife cuts and cauterizes as it goes, or merely cauterizes, as the case may be, superseding in small operations the more dangerous cauterizing acid or the red hot iron. The various shapes and sizes of electrodes, each fitting in the same handle, enable the operator to successfully treat a spot in the nose, inside the throat or other place equally inaccessible by ordinary methods. The same apparatus also furnishes power for a small examination or diagnostic lamp—

a tiny incandescent bulb with reflector, which requires but a low voltage and illuminates the throat or other point under inspection.

Another triumph in surgical advancement is the bone surgery engine—a flexible shaft driven by a motor at one end and at the other a handpiece for holding various drills, burs or trephines. These little cutters go through the bones so quickly and easily that the time of operation is much reduced, there is less shock to the patient, and the convenience of small and special tools that can be quickly sterilized, replacing the cumbersome mallet and chisel method, enables the surgeon to operate successfully on cases that would otherwise be hopeless.

Among the injuries to the human eye many are caused, especially in factory towns, by a small piece of steel or iron flying into the eye, and these are most hard to abstract from that delicate organ; but again electricity comes to our aid. A magnet will attract iron particles and an electro-magnet is the most powerful magnet known. Giant eye magnets of this kind are manufactured for ophthalmologists with a lifting power of 400 pounds, and in all sizes down to a small hand instrument that can be carried in the pocket. By this means many eyes are saved every year, and the metallic chips drawn out when it would be almost impossible to do this by any other method.



Heat has been used for generations for the allaying of inflammation. Hot bricks, soapstones and hot water bottles are still household remedies. It has also long been recognized that the sun's rays are life givers and germ destroyers. Hence the utilization of a little artificial sunlight in the physician's office. Again electricity furnishes the means. High candle power incandescent lights, properly placed in correctly designed reflectors, with special colored glass ray screens, are becoming a wonderfully effective ally in the battle with disease.

Somewhat akin to the mechanical massage, and often obtained from the same apparatus, is the pneumatic massage, obtained from a small direct driven pump arranged to give, first, compression, and then a suction stroke, which is applied directly to the flesh by various attachments, one even being designed for the massage of the cornea of the eye. At the present day physicial methods are gaining wonderful headway in the treatment of disease, and every discerning physician has to employ them to a large extent.

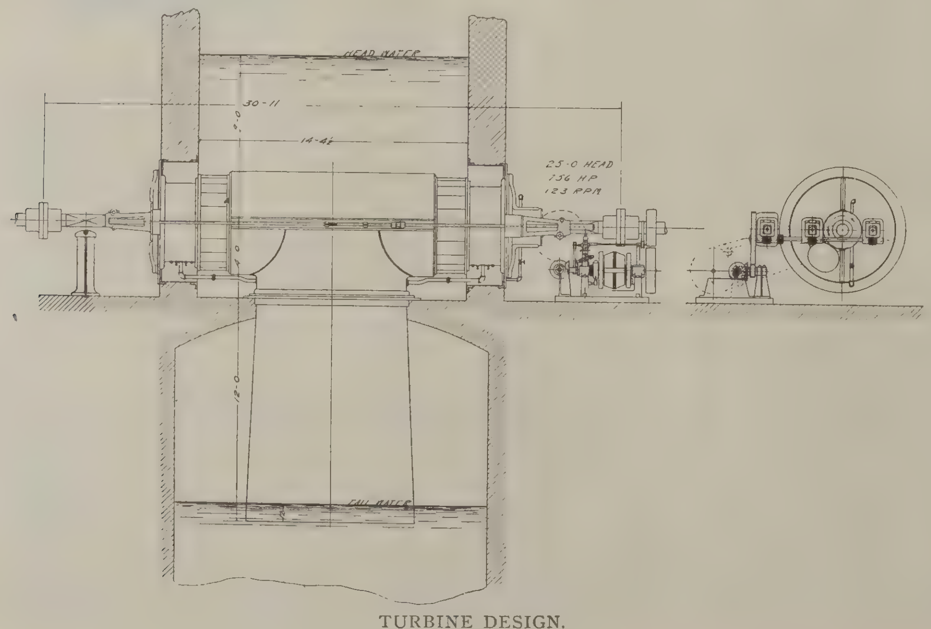
The benefits of the electric current are becoming more fully realized each year as the principles are becoming correctly understood, when applied to the human body as a modality. Various forms of this wonderful agent are used—the sinusoidal, the faradic, the galvanic and the static—and many different kinds of apparatus have been developed to properly regulate and control their action, and most of these can be attained by means of the proper instruments directly from the street circuit. The line of wall plates, current controllers and transformers is a large one, and many combinations are offered where it is desired to obtain several of the modalities with a single apparatus.

The factor of high quality is the one constantly striven for and emphasized by the Victor Electric Company, both in design and workmanship, and the reputation of their goods is such that they now occupy an enviable position in their special field, and the trademark "Victor" has become synonymous with the word quality.

TURBINES FOR NEW ZEALAND DEVELOPMENT.

One of the most prominent recent developments in New Zealand is one now being made by the Southland Frozen Meat and Produce Export Company at their Mataura Works, and for which the Dayton Globe Iron Works Company, of Dayton, Ohio, is constructing a pair of 42 inch special cylinder gate New American turbines, as shown by accompanying illustration. These turbines will be placed in an open concrete flume of special design with the shaft extending at both ends. This pair of wheels is mounted horizontally upon a central discharge case and discharges through a single draft tube into a tailrace 16 feet below the center of the wheel shaft. The wheels will operate under 25 foot head and develop 756 horse power and 123 revolutions per minute. There will be a rope drive consisting of twenty-seven 1¾ inch manila ropes, which will transmit the power to a line shaft, from which the generators and various machinery throughout the plant will be driven. This order was placed through William Wood & Co., by their engineer, Mr. John Johnston, of Invercargill, New Zealand, who visited the United States during the early part of the present year for the purpose of investigating the merit of various turbines built in this country, and after a thorough investigation of different makes placed the order with the Dayton Globe Iron Works Company for the unit as above described.

The Dayton Globe Iron Works Company reports splendid foreign orders for its machinery.



TURBINE DESIGN.

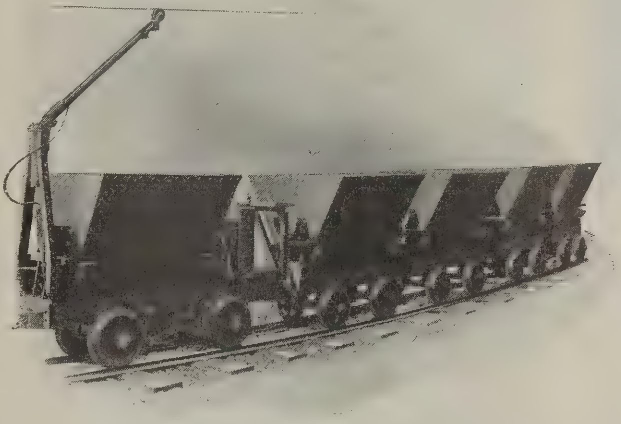
ELECTRIC DUMP CARS.

The illustration herewith shows a novel electrically driven dump car brought out by the Jeffrey Manufacturing Company, of Columbus, O., the well-known manufacturers of electric locomotives and motor car equipment.

The dump car is standard in design with a steel frame, constructed so that an electric motor can be attached for operating it. A simple form of under-running trolley, together with controlling devices for operating the car, is used, as will be seen in the illustration.

The dump car here shown has a capacity for handling thirty-two cubic feet of earth or simlar material, but other sizes are manufactured to suit various requirements. An electric motor of proper capacity to suit the size of the car is geared to one axle by single reduction gearing. The total weight of the empty car with electrical equipment is, approximately, 2,900 pounds. It is capable of hauling a train of several other cars as trailers. It makes a very simple equipment, and one which will appeal to contractors who have access to electric power.

This type of electrically propelled dump car is said to be very easily handled and at a minimum of expense. Full data regarding equipments of this kind can be had by addressing the manufacturers.



ELECTRIC DUMP CARS.

IMPORTANT CONTRACT.

The General Fireproofing Company, of Youngstown, Ohio, has been awarded the contract for furnishing and erecting pin-connected girder frames and cold twisted lug bars as reinforcement for two new reinforced concrete buildings for the Victor Talking Machine Company, at Camden, N. J. One structure is a six-story factory building, 132 x 90 feet, and the other a power house, one story and basement, 173 x 70 feet.

Ballinger & Perrot, Philadelphia, are the architects; Jay M. Whitham, Philadelphia, engineer, and the general contractors are J. S. Rogers & Co., Stanwick, N. J.

The contract with the General Fireproofing Company calls not only for the sale of the reinforcing steel but for its erection in the forms ready for concreting.

BOUGHT THE BUFFALO MEAT CUTTER.

One of the chief features of the trade exhibits in connection with the recent annual convention of the United Master Butchers of America at Niagara Falls was the "Buffalo" ball-bearing silent meat cutter shown by the John E. Smith's Sons Company, of Buffalo, the well-known manufacturers of butchers' machinery. The Buffalo cutter was in operation with the latest improvements and attachments which have made it famous, and it made a big hit with the visiting butchers.

There was quite a scramble to get this particular cutter. Of course, the John E. Smith's Sons Company had plenty more in stock or in course of construction, but the one shown at the exhibition seemed to be the desire of those butchers who had thus far failed to equip themselves with such a machine. Henry Hoffman, of Utica, N. Y., was the butcher who got the prize. After seeing this machine it did not take him long to realize its advantages, and he was quick to snap it up before others got in ahead of him.

INCREASED FACILITIES.

The Standard Roller Bearing Company, of Philadelphia, Pa., has recently made many large additions to its plant and now has the largest works of its kind in the world. The buildings extend over one-half mile of ground from end to end, having a floor space of over 500,000 square feet, the concern now employing over 1,500 men.

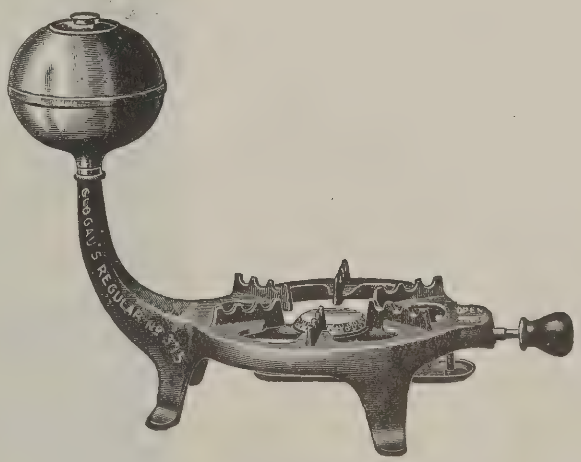
The business has grown to such proportions as to necessitate the establishing of a thoroughly organized department of publicity. The new department will be conducted by Mr. C. Dickens Sternfels, who has been identified in a similar capacity with the Arthur Koppel Company, Pittsburgh, Pa., for the past three years.

Mr. Sternfels assumed charge of the Standard Roller Bearing Company's Publicity Department on September 16 and is located in Philadelphia, Pa.

ALCOHOL STOVES.

The accompanying illustration represents one of the alcohol stoves made by Glogau & Co., 1053 Dickey Building, Chicago, Ill.

Among its many advantages over the old style alcohol stove may be mentioned the fact that the stoves consume an alcohol gas which they manufacture themselves. As the alcohol reservoir is away from the flames all possible dangers are eliminated, and it is possible to fill the alcohol tank while the stove is in use. As nothing but alcohol gas is burned the consumption of alcohol amounts to only two or three cents' worth per hour. A liter (quart) of water boils inside of seven or eight minutes. Its main advantage over other alcohol stoves is that the flames can be regulated so that it is possible to have high or low flame, making it specially adapted to long cooking. It burns odorless, smokeless and noiseless, and forms no soot.



ALCOHOL STOVE.

The illustration represents a single burner stove. The firm named above also manufactures double burners in which one or two flames can be burned at the same time.

Any firms which may be interested in the goods should address the firm named above, either in Spanish or English, and they will receive further particulars.

MOON DESKS.

There are three M's in the name and address of the Moon Desk Company, Muskegon, Mich. There are also three M's in this company's terse description of its Grade A desks—"Modern, Majestic, Massive." This company states that its Grade A material is selected genuine mahogany or quarter-sawed white oak. The construction is high grade in every respect, extra heavy double writing desk, massive double desk top, roll curtain, all construction lock jointed. All drawers have three-ply maple built of birdseye maple bottom and white maple sides and end.

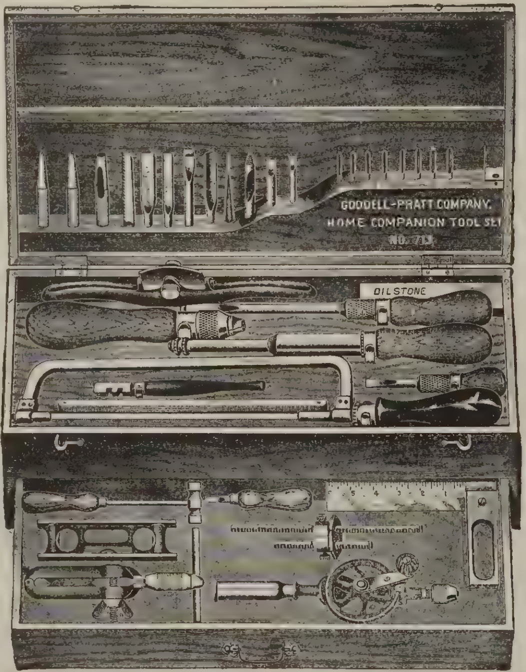
A type of this grade of office desk is shown in the accompanying illustration.

The same company's Grade 1 has selected quarter-sawed white oak for its material. Grade 2 has best quarter-sawed white oak.

All goods are shipped knocked down and carefully packed. In addition to standard office desks, the company makes typewriter stands and directors' tables.

HOME COMPANION TOOL SET.

The Goodell-Pratt Company, of Greenfield, Mass., is making quite a considerable addition to its line of Home Companion Tool Sets, which have proven so popular during the last few years. The particular one illustrated herewith is the most complete assortment the company is at present putting on the market. It consists of a polished hardwood case, 16 inches long, 8½ inches wide, 5½ inches deep; the tools are contained in the top, and also in a drawer, as shown in cut; they are held in place by suitable clips, and the variety selected will enable anyone in the home to do almost any odd job that could possibly come up. The price charged for these sets represents only the price of the tools themselves and a very small part of the cost of the case; it makes a neat, desirable equipment, and with the five sizes and additions at present offered, a variety that cannot fail to stimulate a tool trade in any locality where they are shown up is given.



TOOL SET AND BOX.

Dealers will at once appreciate these sets as being particularly adapted to the special holiday sales.

Further particulars will be found in the company's new No. 8 catalogue, which has been distributed to the trade generally and will be sent to any address.

This little book gives full details in regard to about 350 tools used by carpenters and mechanics generally. The tools described are guaranteed to be of the finest quality, and are particularly designed for saving time and labor.

CONCRETE TESTS.

That concrete blocks properly made are capable of withstanding enormous crushing strain is borne out in the following tests made by Professor Crocker, of the Mechanics Institute, Rochester, N. Y. A block made on "Hercules" machines by Palermo Bros., Mount Morris, N. Y., containing 126 square inches, total area—net area, deducting air space, 100 square inches—crushed at 181,000 pounds, which is equivalent to 1,436 pounds per square inch total area and 1,810 per square inch net area.

A second test made with block produced on Hercules machine operated by J. F. Norris, Brighton, N. Y., size of block 8 x 12 x 24. This block was subjected to 200,000 pounds' crushing test and refused to break. The limit of the testing apparatus having been reached it was impossible to learn how much additional weight would be required to break the block.

The two blocks submitted were regular stock blocks made of good material mixed with a two to one facing and a five to one backing. According to Hercules methods a sufficient amount of water had been used when the blocks were made to insure perfect chemical action.

KENT PULVERIZERS.

Owing to the reduction in cost of material and the increased facilities which the Kent Mill Company, of New York, now has for manufacturing, the company announces that it is now able to reduce the price materially of Kent pulverizers.

The Kent pulverizer grinds any quartz, ore, cement, phosphate, rock, or hard material. Among the strong features of the interior of the Kent mill may be mentioned:

The ring revolves and the three rolls press against its inner face, there being only four wearing parts. The rolls are convex, and the ring is concave and tracks on the rolls. The springs support the rolls yieldingly, and the rolls support the ring, so that the four crushing parts are free to move to pass iron or uncrushable objects, and are cushioned to take up shock and vibration and prevent crystallization or breakage. The rock falls from the inlets onto the inner face of the ring. Centrifugal force holds it there in a layer an inch deep. It revolves with the ring, and passes under the rolls. The rolls are pressed by the springs outwardly against the rock on the ring with a pressure adjustable to 20,000 pounds by the screws against the springs. The rolls roll over the rock, crushing it against the ring. The crushed rock flows off each side of the ring into the casing and falls to the discharge. The body of rock between the rolls and the ring makes 90 per cent. of the rock abrade on itself in crushing, thus reducing the wear on the wearing parts to less than 10 per cent. of that on any other pulverizer. Their wearing depth is double that of any other machine. There is no rubbing on the rock and the wear is reduced to the minimum.

The Kent Mill Company issues an unusually well arranged and handsome booklet, describing fully its Kent pulverizers and entering into the various features of excellence combined in this machine.

JONES SPEEDOMETER.

The illustration shows S. F. Edge, of the Royal Automobile Club, at the wheel of one of his Napier cars on Brooklands Track, London, England. Directly in front just above the arm of the steering wheel will be seen the Jones speedometer. This instrument was invaluable to Mr. Edge in making his 24 hour record, the most remarkable performance ever made by man. He traveled for 24 hours at a speed of 66 miles per hour, covering in all 1,581 miles 1,310 yards. By the use of the Jones speedometer he was able to accurately gauge the speed of his car and maintain the average for each mile that he wished.

The original intention of Mr. Edge was to drive 24 hours and cover one mile in each 60 seconds. This would have brought the record to 1,440 miles. Instead of this it will be seen that he bettered this performance by more than 141 miles. Mr. Edge has paid his personal tribute to Joseph W. Jones, of New York City, the inventor of the Jones speedometer, in a letter received which reads:

"The Jones speedometers were simply invaluable. In fact for a long distance ride on the track one could not do anything like as well without such a splendid and reliable speed recorder as the Jones. I would never be without one when running on the track. I think no speedometer in the world ever had such rapid and violent testing, and they all came through perfectly."

The ever-present statistician who figured out the revolutions of the cable within the shaft of the speedometer at a 66 mile per hour speed has brought the revolutions to total at 2,805 per minute, or 168,300 per hour, or 4,039,200 in 24 hours.

S. F. EDGE.

WITHERBEE IGNITERS.

In a certain sense the parts of a motor car, while known as accessories, are recognized as absolute necessities. For instance, a car could not very well travel without tires. It wouldn't be safe to go through the night without lamps. It isn't advisable to let your chauffeur use his idea of speed—all cars should carry a speed indicator. The car without a perfect ignition system isn't much of a car.

The Witherbee Igniter Company recently received a letter from the Lozier Motor Company which should be of interest to every driver of a motor car. It read:

"It may interest you to know that in all contests in which the Lozier car has competed this year the Witherbee battery has been used. In the twenty-four hour races it has been in an exposed position on a platform on the rear of the chassis, without any covering whatever. In the twenty-four hour race which the Lozier car won at Philadelphia, thirteen hours of which was run through a blinding rain storm with tire chains on all four wheels, and with the track covered from three to six inches deep with mud, the batteries worked beautifully, although whenever the car came off the track for water, gasoline and supplies from two to ten pounds of mud was scraped from the top of the battery. In fact, it was necessary to take several hundred pounds of mud off of the car to lighten it up. In starting the motor again the battery never failed to respond, and early Sunday morning, the day after the race closed, the car was run to New York under its own power and put in our show window, where, during the two weeks it remained on exhibition, the motor was started dozens of times on the compression and batteries."

PAINT DEVELOPMENTS.

With the past fifteen or twenty years there has been wonderful development in the method of offering goods for sale. Formerly sugar, salt, coffee—practically all the necessities and luxuries of life—were sold in bulk form from open casks, bags or barrels, with a great loss in both quality and quantity to the dealer and the consumer. Now, practically everything which it is necessary to buy for the home can be purchased under trademarked brands, in sealed packages ready for use.

This development has been particularly noticeable in the paint and varnish industry. The manufacturer now prepares his product ready for use, and turns it over to the dealer in sealed packages. Formerly the dealer bought white lead, dry colors, colors in oil and other staples in bulk, and sold them in small quantities as needed.

Paint manufacturers now offer their goods in all size packages from quarter-pints to barrels, and dealer, painter or consumer can buy just the right quantity of any kind of painting material. This prevents waste and saves much time. Then, too, there has been a remarkable development in the quality of the preparations offered. It is now possible by asking for well known trade-marked brands to secure a perfect paint, enamel, stain or varnish for any article or surface, wood or metal, inside or out, old or new.

The largest paint and varnish plant in the world, the Acme White Lead and Color Works, Detroit, Mich., U. S. A., have devoted special attention to putting up their goods to meet all the requirements of dealers and painters alike. Their trademarked line called "The Acme Quality Kind" is most complete and of the very highest grade in quality. This firm have given special attention to the needs of the retail dealer, and have spared no trouble or expense to make their goods the best and most satisfactory that can be made.

They are especially well equipped to handle export orders, having a foreign department with experienced commercial translators and correspondents, which makes a special study of peculiar trade conditions in foreign countries, and is prepared to meet the most particular requirements of foreign customers.

ENLARGED OFFICES.

The National Wood Pipe Company, of Los Angeles, Cal., announces that owing to the unprecedented growth of its business and the establishment of the general offices of this company in Los Angeles, necessitating additional space for its officials, engineering corps and clerical staff, it has secured commodious rooms in the Equitable Savings Bank Building, and is now located in the new offices.

WATERPROOF LEATHER BELTING.

(WRITTEN FOR THE AMERICAN EXPORTER.)

By H. C. Bursley,

Editor of "The Belt Book."

American leather belting is recognized as the best, almost, if not quite, the world over, and there are several very excellent reasons for this, reasons which the European belting manufacturers cannot overcome. Not so very long ago America imported belting. Now the largest American belting houses are selling a large and ever-increasing amount of belting in Europe.

The chief reason for the superiority of the American belt is the abundance of oak bark in the American forests. No other tanning material can compare with oak bark for making belting. The European manufacturers use very little oak bark, because of its scarcity and necessarily excessive cost, and in the substitution of other tanning materials they, at the beginning, place themselves under an immense handicap.

There are, of course, different grades of American belting, and much of the product sent out by American manufacturers is of poor quality. The buyer of belting should be careful in his selection to purchase from a firm of recognized standing, and whose belting is of proven quality. When such a selection has been made he can be quite sure that his American belting will give satisfaction. Indeed if it does not there are a few American concerns that agree with every sale of belting to take it back if it does not suit.

The broadening of the market for American belting, as well as the more and more varied conditions under which leather belting has come to be used, has led the foremost concerns in the business to scientific specializing to meet such differing conditions. There is, for instance, the belting made in an especial manner for use with electrical machinery, and in every way better adapted for such use than ordinary belting.

It has long been a disputed question, not only among belt users but among the manufacturers themselves, whether it was possible to make a waterproof and steamproof leather belting. Perhaps the general opinion has been more or less skeptical. The average belt user has said: "Show me the waterproof leather belting and I will believe that it can be made." No one has questioned the necessity for such an improvement. It is now certain that the necessity has created the improvement. Waterproof, steamproof, acid-proof, leather belting has been made, and has stood the test publicly, to the satisfaction of all who have witnessed the exhibition.

An eye witness to some of the tests, as they have been made at the Jamestown, Va., U. S. A., Exposition for the past five months, has this to say of the exhibit:

"There is a beautifully painted glass picture representing a lake, out of which flows a real waterfall upon a roll of this belting, which is called 'Duxbak,' because, as the manufacturers say, 'it sheds water like a duck's back.' The size and magnificence of this display can best be realized when it is known that the beautiful big roll of belting is eight inches in width and forty-two inches in height. The rear of the plate of glass and the frame are lighted up with 148 electric lights. The water falls from a fissure in the glass so naturally that it appears a natural waterfall from the lake itself. It drenches the entire surface of the belt coil, and the pond formed by the overflow covers the bottom part of the coil to a depth of eight inches.

"Notwithstanding the fact that the belt is soaked all day long in this depth of water in the tank, it is perfectly dry and flexible when the water is turned off at night and the tank drained. In fact, the belting is so firm and solid and has so little affinity for water that it hardly appears at all wet the instant the falls are turned off. In order to further demonstrate the absolutely waterproof character of the 'Duxbak' belting the end of the roll is uncoiled and is erected under the falls so that the sides of the roll are thoroughly drenched. The water hits the belt just at the end of the lap, and plays continuously all day long right in the cement. This particular coil of belt has already remained under the water four months, and it is the intention of the makers, Charles A. Schieren & Co., to leave it there during the remainder of the Exposition, having confidence that it will be as good as new at the end of that time.

"Visitors are greatly impressed by the substantial and honest character of this test, which is, in fact, the severest to which a belt could be subjected. When it merely revolves in water the tendency is to throw the water off the surface, but with the waterfall under high pressure, as in this demonstration, the water strives to enter every fibre of the leather, but without avail, and the waterproof cement makes the laps impervious as well."

This waterproof and steamproof belting will prove of exceptional value in all establishments, such as sugar refineries on centrifugals, where belting necessarily comes in contact with molasses, and is in other ways subjected to steam and moisture. It seems certain that this is another of the American "new ideas" that is destined to be adopted throughout the world for meeting special conditions.

Some of the American belting manufacturers are adopting most progressive selling methods, which are of themselves alone certain to make friends for their product in the foreign markets. In these methods they are ahead of the general run of manufacturers who attempt to build up their export business. Messrs. Charles A. Schieren & Co., manufacturers of "Duxbak," for instance, are sending some of their best men into the foreign markets. The company already has a large and prosperous branch in Hamburg, and has recently had special representatives in Cuba and Porto Rico, and expects to make an active campaign in this field. It is most liberal, too, in its guarantees as to the reliability of its belting, inserting in all its advertising and letters the wish to have any belt returned that does not measure up to specifications.

NEW WHITE FACTORY.

The White Company have just issued their Bulletin No. 13, which is devoted mainly to a description of the new factory in which the White steamers are made. The pamphlet is copiously illustrated with two-color engravings, showing some of the notable features of the plant. The new White manufacturing establishment contains many novelties in factory construction, such as a great central corridor, 600 feet long by 30 feet wide, which is used solely as an avenue of communication between the other units of the plant. The factory is a one-story structure with saw-tooth roof, so that every part of the plant has an abundance of natural light. There is a basement under each department for the storage of material, the basements communicating with the main floor by means of electric elevators.

The factory is so thoroughly fireproof that it is not insured, the company carrying its own risk, such as it is. The factory equipment is of that high grade which would naturally be expected of a company of practically unlimited resources. The most interesting feature of the plant, however, is the highly developed methods of large scale production, the outgrowth of an experience of thirty-five years in the production of high grade machinery in quantity. A typical illustration in the bulletin shows a double milling machine, making a certain cut on an engine case. This machine, having once been adjusted to make this one cut, is not readjusted to do any other work until it has made this cut on an entire season's supply of engine cases. It is such far-seeing factory methods, combined with the popularity of the product, which have made the White Company the largest manufacturer of large touring cars in the world.

A few pages in the new bulletin are devoted to an announcement of the White models for 1908.

STARRETT TWIN GAS HEATER.

The Starrett patented double tube gas heaters are made with nickel plated burners and japanned bases, and with their attachments prove to be most convenient and effective heaters for use in various mechanical arts.

Their effectiveness lies in their scientific construction, being so made as to cause the gas and air to become thoroughly mixed for perfect combustion while passing through deflectors in base of tubes. The tubes are so formed as to cause the flames to penetrate each other at cross angles, thus producing a clean, intense heat, free from smoke and with no waste of gas.

TWIN GAS HEATER.

The heater will be found very useful in the machine shop, as it is convenient for tempering small tools, melting lead, babbitt, etc., and as a forge for light work it will be found very valuable. Plumbers, tinsmiths, electricians, jewelers, dentists, barbers and others will also find it valuable. For laboratory and household use it has no equal. Over it a quart of water will boil in six minutes.

THE L. S. STARRETT CO. ATHOL, MASS. U.S.A.

STARRETT HEATER.

By reference to the above cuts the directions for using this heater for tool work may be followed.

Screw the burner to the base so that the tool holder (when in use) will be horizontal. If blaze is not vertical, bend one of the deflectors in or out. They are made for directing the flow of gas to the ducts. Do not get them too close together.

In hardening tools, the burner should be shielded from light and draft. Avoid leakage at joints. Best results are attained with a full head of gas, which, with the air, is injected through the mixing chamber, producing a blast.

Do not turn the blaze below a blue color, as good results cannot be obtained with a white blaze. If a white blaze appears on lighting, turn out and relight. For holding small pieces to be heated, roll up several different sized tubes of tin to act as holders.

Soldering irons with short handles can be used with this heater without fear of heating the handle.

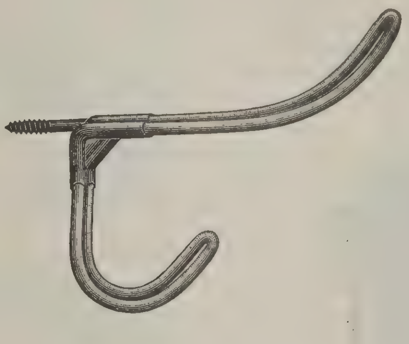
The two and three burner heaters are made with a graduated adjusting tube on the end, to supply the gas to one or more burners. For example, if gas is desired in one burner only, adjust the tube so that the figure one will coincide with the index mark on the base; for gas in two burners have the figure two coincide with the index, and so on.

Among the other Starrett products selling largely abroad may be mentioned steel rules, straight edges, steel tapes, steel squares, protractors, inclinometers, caliper squares, pocket slide calipers, micrometer calipers, bevels, screw pitch gauges, depth gauges, clamps, jack screws, plumb bobs, center indicators, hack saws and frames, scribers, scratch gauges, cut nippers, surface gauges, speed indicators, calipers, etc.

THE L. S. STARRETT CO.
ATHOL, MASS. U. S. A.

BRADLEY "METAL CLASP" HALL HOOKS.

The Atlas Manufacturing Company, 125 Water street, New Haven, Conn., have recently placed upon the market the hall or bathroom hook illustrated herewith. The hook embodies the principal features of their regular coat and hat hook, viz., the use of the metal clasp in the corner of the hook, which adds great strength and results in a much more open and roomy hook. The device for keeping the hook from turning on the screw, viz., the swell at the back of the lower hook, still continues to be a feature. In fact, the only difference between this hall hook and the regular hook is in the fact that it is a larger hook to commence with, being four inches long, and in the fact that the upper hook is lengthened and turned upward so as to give a secure support for hats of all shapes and sizes. It is furnished japanned, coppered, tinned, brass and nickel plated, and packed one-quarter gross in a paper box, six gross in a case.



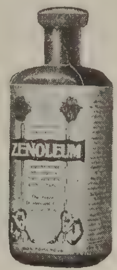
FERRO ENGINES ABROAD.

After making a careful study of the foreign field the Ferro Machine and Foundry Company, of Cleveland, became so thoroughly impressed with the possibilities of selling their type of marine engine abroad that May 15 they organized a foreign department to carry on correspondence in the five principal European languages, and issue catalogues and literature in French, German and Spanish. The results obtained from this aggressive foreign campaign of less than two months have been remarkable, considering the fact that it has been carried on through correspondence alone.

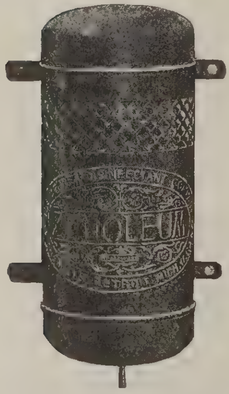
Ferro engines have been sold in Great Britain, France, Austria, Spain, Italy, Holland, Belgium, Norway, Sweden, Russia, China, Australia, Mexico, Central America and the principal South American countries, besides Cuba, Porto Rico and Panama. The largest business in any one foreign country has been done through the British agency of Joseph Day & Co., London, who have lately placed an order for sixteen more Ferro engines, making a total of seventy-five engines since the first of the year. The second largest Ferro foreign agency is in Russia, with A. W. Starikoff, of Moscow, who has sold forty-three engines in 1907.

DISINFECTANT AND ANIMAL DIP.

Zenoleum, manufactured by the Zenner Disinfectant Company, of Detroit, Mich., is maintaining its good record for large sales and effective use. It is claimed for Zenoleum that it is a disinfectant, animal dip, antiseptic, insecticide, lice killer and vermin destroyer; it is absolutely non-poisonous, stainless, non-explosive, non-inflammable, non-corrosive, and in fact an ideal disinfectant in every way. It is perfectly safe to have about the house and stable, as it will not in any way injure children or live stock.



It can be used about the household. It also has a great many uses in connection with the various classes of live stock, especially cattle, sheep, swine, horses, donkeys, mules and poultry.



It is used and publicly recommended by forty-three State agricultural colleges in the United States and foreign countries. It is especially valuable in cases of skin trouble, such as mange, scabies, surfeit, ringworms, etc.

When used about the home as a general disinfectant it purifies the air and disinfects articles with which it comes in contact. It leaves everything in a thoroughly wholesome and sanitary condition. It can be used in scrub water, as a spray, or can be left to evaporate in open dishes with water. It can also be used in boiling water, so that the fumes will rise and penetrate. It is especially desirable for disinfecting and deodorizing sinks, cesspools, vaults, closets, drains, garbage receptacles and sickroom vessels.

The biggest and best hospitals throughout the United States buy and use it in large quantities as a general disinfectant and antiseptic, also for sterilizing bedding and table linen from infectious cases, putting Zenoleum right in the laundry water.

It is used all over the United States and Canada in public buildings such as hotels, schools, colleges, hospitals, office buildings, prisons, factories, railroad stations, railroad trains, steamships, stores and the home.

The machine is made of oxidized copper, with a capacity of about a quart; works automatically, emptying itself about once a month. It is easily filled and taken care of, requiring attention about once a month, being filled just the same as an ordinary kerosene lamp. The machine is made in two styles, one style having a front drip which drops directly into the urinal bowls, and the second style being connected with the closets with about three feet of brass piping.

The machine fluid has a bright red tinge, highly aromatic in odor, very oily in nature and very penetrating in its disinfecting powers. It is shipped ready for use, and requires no dilution or change.

The London office of the Allis-Chalmers Company, Salisbury House, Finsbury Circus, announces that it has just secured an order for one of this company's vertical cross compound Reynolds Corliss engines, 26 inch and 56 inch by 48 inch.

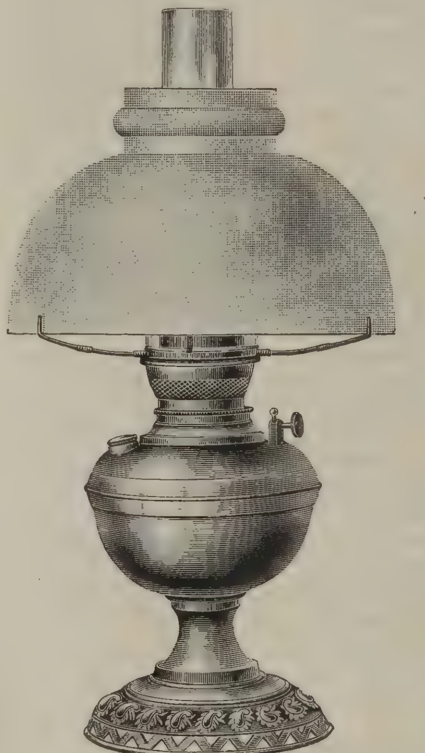
BRASS GOODS.

The Plume & Atwood Manufacturing Company was organized in 1869 at Waterbury, Conn., for the purpose of manufacturing brass goods. Soon after its formation the company purchased the plant of the Hayden Griggs Manufacturing Company, and in 1871 acquired the brass rolling mills of the Thomas Manufacturing Company, of Thomaston, Conn. The establishments at both Waterbury and Thomaston have been enlarged from year to year until they now comprise one of the most extensive plants for the manufacture of sheet brass, rod, tubing and wire in the world.

In the Waterbury plant are manufactured oil stoves, oil bicycle lamps, lamp trimmings, kerosene burners, candlesticks, copper rivets and burrs, butts, chain, telephone and clock bells, etc.

The general offices and salesrooms are located at 279 Broadway, New York City, and are under the direct management of Mr. Albert E. Snow, who has been with the company since 1890.

This firm is enjoying a good foreign trade, which is increasing very rapidly. Separate catalogues are issued from time to time on metal, kerosene lamp goods, gas goods and electrical parts. These books are valuable for the different lines of trade for which they are prepared and will be sent to interested parties on request, prepaid.



LOZIER CARS.

One of the foremost examples of the high state of perfection reached in the automobile industry in this country is the car manufactured by the Lozier Company, of New York. This company has been known in the foreign markets for many years as builders of Cleveland bicycles, and later as manufacturers of marine motors, the building of which was commented about ten years ago. In commencing the manufacture of automobiles in 1904, they adopted a somewhat different policy from that followed by the majority of automobile builders. They constructed the cars in their own factories, practically from raw material, and followed the same exacting methods and careful system of supervision and inspection which were employed in the manufacture of their bicycles and marine motors. Therefore, instead of attempting to produce a large number of purchasing motors, transmission, parts, etc., and merely assembling, they carefully built up an organization capable of producing a distinctly original car and one that could successfully compete with the best foreign cars.

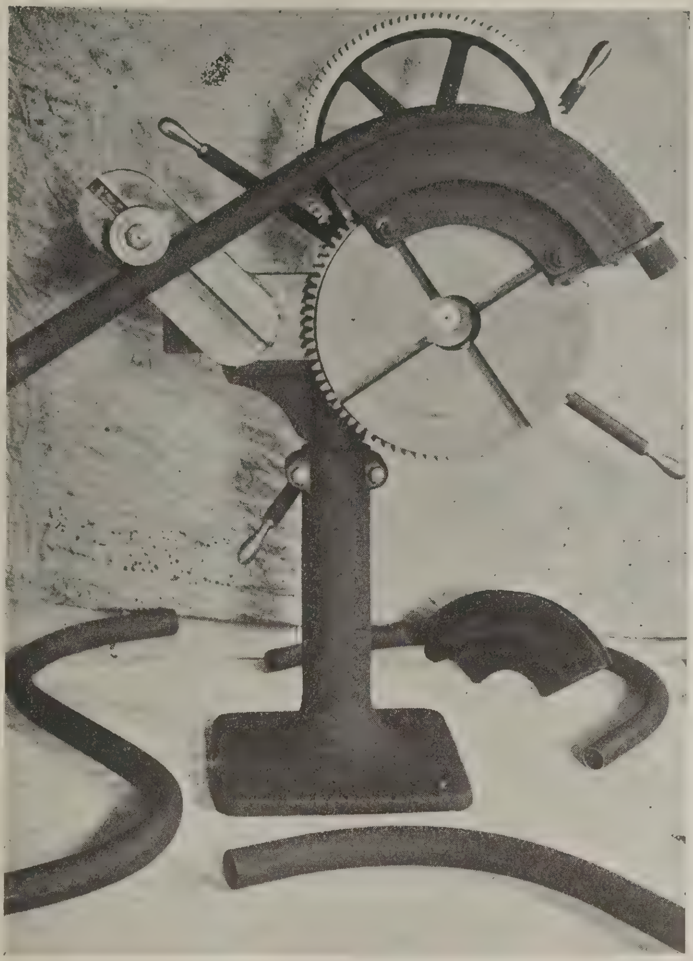
Even in the earliest models put out the company made known its intention of producing a high grade car by the employment of such features as 36 inch wheels, Hess-Bright bearings, mechanically actuated inlet and exhaust valves, double ignition system employing high tension magneto and storage batteries, long wheel base (117 inches), and other important devices and features.

IMPROVED PIPE BENDING MACHINE.

The machine shown in the accompanying illustration embodies many new and desirable features, and its efficiency, durability and ease of operation have placed it in high favor with users of this class of machinery. It has been found to be of most appreciable value in plants where there is much pipe or conduit work, and it is adapted for any and all kinds of pipe bending.

The machine is strongly constructed and will stand great stress. It is designed to be easily portable and has a telescopic stand, which can be raised or lowered to a suitable height. When the base is fastened, the upper part swivels. A universal arm or section for the stand is also furnished, so that if desired the face plate can be placed in a horizontal position at any height from the floor.

The gears of the machine are all cut and of heavy pitch; the ratio of gearing, 25 to 1, gives a powerful leverage. The continuous rotary movement of the face plate, upon which the quadrants or formers are located, is a desirable advantage, as it is of much importance and convenience for many classes of work. The resistance stud is located on a movable arm provided with a "T" slot, permitting the stud to be placed anywhere within the radius of the arm. This particular feature offers adaptability for any sort of pipe bending. Piping of steel, iron, brass, copper and other material can be bent cold up to and including 2 inches in diameter. The machine is also adaptable by means of special formers for bending light angles, flat and tee bars.


PIPE BENDING MACHINE.

The gears, body of the machine and the stand have been carefully proportioned for the stress that they must stand, and the durability of the machine is one of its most marked features. It weighs complete 750 pounds. The outside dimensions are 4 feet 7 inches in width and 5 feet in height; the base of the stand measures 18 by 18 inches. The machine is furnished either mounted on an adjustable stand or with a plain stand. Hendrick & Smith, Germantown, Pa., are the makers.

TRADE PUBLICATIONS

TURBINE GENERATOR.

"The Curtis Steam Turbine Generator" is the title of a large pamphlet (No. 4531) issued by the General Electric Company, Schenectady, N. Y., that is perhaps the most complete and handsome publication ever sent out by any turbine manufacturer. The printing and general style of the pamphlet is very attractive, but will be found of a special interest to engineers on account of the information given with regard to superheat, vacuum, economy, etc., and the details of construction and operation of all parts of the Curtis apparatus.

Under the heading of "Economy" detailed tests are given of 9,000 kilowatt, 5,000 kilowatt, 2,250 kilowatt and 1,000 kilowatt turbines, which show some very remarkable high efficiencies. The advance made by this type of turbine is illustrated by the maker's claim that nearly 1,000,000 kilowatts of Curtis steam turbine generators have been sold. Special attention is called to the flat efficiency curve giving high efficiency at overloads and light loads, the simplicity of design, the low maintenance, the economy in space, etc.

This publication seems to be typical of the recent desire to have such information written by and to engineers, and the following synopsis of its contents will show the wide field covered: Advantage of vertical shaft type, economy of space, building materials and steam, clearances, flow of steam, balance, lubrication, the construction of buckets, governors, foundation, low pressure turbines, vacuum, regulation, parallel operation, ventilation, economy, etc.

Of the illustrations, the following may be taken as having special interest: those showing the interior of the Fisk Street Station at Chicago and cross sectional view of a 9,000 kilowatt turbine, the method of cutting and riveting buckets, the hydraulic governor, low pressure turbine sets installed and economy curves.

Picture Frames.—The Pioneer Portrait and Picture Frame Company, of Chicago, Ill., issues a handsomely illustrated catalogue listing its line of picture frames and framed pictures. Among the goods illustrated are religious oleographs, family records, pastel fac-similes, photo colors, frames and supplies.

Carriages.—Frank J. Enger, Cincinnati, Ohio, issues export catalogue No. 27, illustrating and describing this firm's well known line of high grade carriages, known as the "Clover Leaf Line." Among the vehicles listed are the Acme cart, phaeton cart, trap cart, Cape Colony four passenger cart, Corning buggy, cut-under trap, phaeton, Handy surrey, barouche, victoria and German victoria.

PUBLISHER'S PAGE

AMERICAN EXPORTER

With which is incorporated
The American Mail and Export Journal.

ESTABLISHED 1877—CONDUCTED BY EXPORT SPECIALISTS.

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Copyright, 1907, by the Johnston Export Publishing Co.

The American Exporter, established more than thirty years ago, is the pioneer and the most extensively circulated publication devoted to furthering of relations between importers and merchants the world over and manufacturers of American goods. It is published on the first of each month in English and on the fifteenth in Spanish (Exportador Americano).

The American Exporter is both independent and impartial. Its publishers have no connection with any manufacturing concern, export house or other business except publishing, and hence have no outside interest to serve. The editorial management is separate and distinct from the business department.

Subscription price to any part of the world, including postage, $2 per year, American gold, or its equivalent sum in any other currency. Single copies, 20 cents.

THIRTY-FIRST YEAR.

With this number the American Exporter reaches its thirty-first year. The publication celebrates the attainment of that age by the first issue of its Domestic Supplement, a monthly bulletin of export information for the American manufacturer engaged in or seeking foreign trade.

It is our belief that this Supplement will prove of material value in adding to the usefulness of the American Exporter, both to its readers abroad and to its advertisers in this country.

The mission of the American Exporter is primarily to inform foreign buyers and importers regarding American machinery and American goods. The mission of the Supplement, on the other hand, is to inform the American manufacturer of foreign markets and foreign needs.

It would seem that the combination which the publication and its offshoot will form should result in a service which will be a strong factor in bringing foreign buyers and American manufacturers in closer touch with one another.

During the past thirty years' existence of the American Exporter this periodical has grown in accordance with the vast increase of America's foreign trade. In those thirty years the American Exporter has seen the foreign trade of the United States grow from small beginnings to the present vast size, and it is the publication's hope that the coming thirty years will see its export trade increase as rapidly as in the past.

FOREIGN TRADE TOURS.

When this number of the American Exporter reaches its readers abroad the publication will have two foreign trade tours under way at the same time. Mr. Hough will complete his European trip about December 1, which has been in every way one of the most successful of the foreign trade tours organized and undertaken by the American Exporter. Mr. Hough has been received with the greatest cordiality by importers and buyers in the countries of Europe which he has visited, and his trip has resulted in a much clearer understanding on the part of foreign buyers of a great many lines of machinery and goods advertised in the American Exporter, and in not a few cases of arrangements being entered into for foreign representation for the American manufacturers. In addition, Mr. Hough has sent reports which will be of great value in assisting American manufacturers to adapt their goods to various European markets of importance.

On November 2d Mr. Lampman sails for Cuba to undertake a tour of that island, similar to that which Mr. Hough is making in Europe. American manufacturers have shown great interest in Mr. Lampman's trip, and he goes armed with valuable information for the Cuban importers.

DOMESTIC SUPPLEMENT.

Our foreign readers are cordially invited to write us regarding any topics which they think should be brought to the attention of American manufacturers and exporters. Our new Domestic Supplement offers an excellent medium for the discussion of topics relative to the mutual advantages of exporters and importers. Suggestions as to adapting American goods to specific foreign markets will be especially welcome.

AMERICAN EXPORTER

DOMESTIC SUPPLEMENT

Vol. LX. No. 5. NEW YORK, NOVEMBER, 1907. 20 cents a copy
$2.00 a year

Published on the 15th of each month as part of the English edition of the American Exporter.

An export bulletin and guide for American manufacturers engaged in or seeking foreign trade

Published by the
JOHNSTON EXPORT PUBLISHING CO.,
EDWIN C. JOHNSTON, General Manager,
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Philadelphia, Pa.: 727 Real Estate Trust Building.
Cleveland, Ohio: 1330 Williamson Building.
Chicago, Ill.: 501 Monadnock Block.

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This Supplement—its purpose is to assist American manufacturers in handling foreign trade and to co-operate with them in enlarging their business abroad—is a part of all copies of the AMERICAN EXPORTER circulated in the United States. It is not contained in copies circulated abroad.

Subscription price, American Exporter, including Domestic Supplement, $2.00 per year; single copies, 20 cents.

Advertising rates submitted on application.

A WORD AT THE START.

The AMERICAN EXPORTER bespeaks for its Domestic Supplement the attention—and some indulgence at first—of the American manufacturers who have assisted in placing the parent publication in its present position of importance and usefulness.

Our Supplement is the result of a desire upon our part, one which has grown in recent months, to talk to American manufacturers engaged in foreign trade and discuss with them the many export problems, hints, suggestions and foreign trade news items which constantly come under our notice. For several reasons it is impolitic to hold such discussions in the regular columns of the AMERICAN EXPORTER. Among these reasons may be cited the fact that matter of the keenest interest to the American manufacturer does not interest the foreign buyers and importers, who make up the vast majority of our readers. Obviously, our duty to both reader and advertiser is to make the AMERICAN EXPORTER as readable as possible to the men who are buyers, or prospective buyers, of American goods.

The decision to issue a supplement in the nature of an export bulletin for the American manufacturer was the result of careful consideration. From day to day the original project has grown, and it is already of greater importance and scope, and a bigger undertaking, than we had originally anticipated. In fact, at the start we merely planned publishing the Supplement as a once-in-a-while adjunct to our regular publication—a sort of heart-to-heart talk to American manufacturers, to be printed whenever we had enough good material to print. We soon saw, however, that it would be necessary to publish it regularly each month, and at the moment of going to press for this, the first, issue, we find ourselves bothered, not by the problem as to what to print but as to what to leave out—for we have more to say than we have room to print it in, and several pages of what seem splendid material are regretfully laid on the table until next month.

In publishing this Supplement we have but one aim, namely, to assist, as much as in our power lies, American manufacturers to increase their foreign trade. This is, and has always been, the aim of the AMERICAN EXPORTER, and the publication of the Domestic Supplement promises to be a valuable lieutenant for the AMERICAN EXPORTER itself.

TRADE-MARKS IN AUSTRALIA.

American manufacturers who are selling goods to Australia should give immediate attention to the matter of registering trade-marks in that country if they have not already done so.

A prominent manufacturing concern—an advertiser in the AMERICAN EXPORTER—has for some years been selling agricultural machinery to Australia through a certain agent. Recently they began negotiations which promised to give them a more advantageous agency proposition in Australia, but when the papers were about to be signed a communication was received from the former agents stating that they had copyrighted the trade-mark of the machinery and no one else could sell the line of goods without the permission of these agents.

It is obvious that if the claim of these agents is upheld the American manufacturers in question are placed in a most awkward position, as they cannot sell their own goods in Australia except through the medium of these agents or with their permission.

It is comparatively recently that the law which apparently makes the claim of these agents good went into effect. The Australian Commonwealth Trade-Mark Act went into effect on April 22, 1906. It extends to the whole Commonwealth, and any trade-mark already registered in any of the states of Australia can be extended to the whole of Australia, unless previously applied for in any other state by another party.

As (subject to extremely strong proof of superior right by another party) the first applicant will be considered the rightful owner of the trade-mark, and in other countries firms have lost valuable trade-marks through others registering their marks first, it is desirable that all firms wishing to have their trade-marks registered in Australia should apply promptly.

The AMERICAN EXPORTER is now in communication with the American consul-general at Melbourne, Australia, regarding this matter, but the case which has so recently been called to our attention proves the necessity of prompt action from American manufacturers who are engaged in or seeking Australian trade. Similar cases in other countries, notably Germany, have frequently arisen.

MEAT MACHINERY IN BRAZIL.—Consul General G. E. Anderson, of Rio de Janeiro, writes that there should be an opening for the sale of American meat working machinery in that part of Brazil. The development of the sausage making industry is going on rapidly and the use of meat waste is more general. Practically all the work is done in small establishments and largely by hand. There are no supply houses dealing in machinery and appliances peculiar to the meat trade. What machinery is now sold is either handled in connection with a general line or is imported direct by the manufacturer.

IT IS reported that the Brazilian Government is having three battleships constructed by British firms. The vessels will probably be of the Dreadnought type.

TEXTILE MACHINERY.

THE AMERICAN EXPORTER WOULD BE GLAD TO RECEIVE COMMUNICATIONS FROM MANUFACTURERS OF TEXTILE MACHINERY IN REGARD TO THE SUBJOINED LETTER.

To the Editor of the AMERICAN EXPORTER, *New York City:*

DEAR SIR—For some time past the Lancashire manufacturers of textile machinery have delayed more and more the delivery of Continental orders, while the steady increase of the textile industry, especially cotton, creates a greater demand for machines, particularly in southern Europe.

The market has to be supplied and trade must go where orders can be filled with greatest speed and regularity.

Sig. Pagnacio, former general manager of Staurenghi & Co.'s weaving mills in Monza (Milan), having left the firm in order to start a mill of his own, told me that he could not get machinery delivered to him within eighteen months at the least. Switzerland is in the same case—the Milan representative of the Ruti (Switzerland) Textile Machinery Works told me that they did not care to accept orders from new customers, as they have quite enough to do supplying the old ones.

It would therefore be interesting to know how American manufacturers stand in this respect; that is to say, whether they are prepared and willing to supply at least the Italian requirements with reasonable speed.

I mention Italy, not because it is the only country that suffers from this scarcity of machinery, but because it is the most seriously affected, and therefore the most promising market. I might add, also, because the textile industry in Italy is progressing and increasing remarkably.

Awaiting your answer with the utmost interest, I am, dear sir, very respectfully yours,

——— ———,

Manchester, England.

P. S.—I am indebted for the name and address of your valuable paper to the U. S. Consulate in Manchester, where it is, by the way, conspicuously displayed in a prominent place. As the contents of the above letter are of a nature to interest your textile machinery manufacturers, I hope you will grant it a corner, however small, in your valuable paper.

——— ———

RAND MINING REQUIREMENTS of electrical machinery and equipment are especially numerous just now.

THE CAPE COLONY is just now an improved market for galvanized iron, cement, paints and other building materials.

GERMAN FIELDS FOR AMERICAN CULTIVATION.

Intelligent Efforts to Enter the Teutonic Market Certain of Profitable Results—Importance of Registering Trade-Marks.

BY B. OLNEY HOUGH.

BERLIN, September 10, 1907.

ANY good American article can be sold in Germany today—if properly introduced and pushed. I believe this statement to be true. It was made to me the other day by an American gentleman resident in Germany for twenty years. But emphasis must be laid upon the *if*. Certain American goods that I can name are today being largely sold in Germany at very considerably higher prices than competing German goods command and for no other reason than that conveyed by those familiar American expressions, hustle, push, enterprise—qualified by the adjective *intelligent*. It goes without saying that Germany is an exceedingly hard market to cultivate. That is natural in view of the extraordinarily high and scientific development of her own manufacturing industries. On every hand I hear but one report as to present business in American goods in general in this country—very prosperous and constantly growing. However, there is room here for many more of our manufacturers than are today represented. What result will attend the efforts of new manufacturers to obtain a footing here depends absolutely and solely upon themselves. The man who fancies that a half-way or a half-hearted effort will get him business in this great country is doomed to disappointment. Measures that may do well enough for Guatemala, for example, will not result profitably in Germany. In Germany we are face to face with a prodigiously successful people and one inordinately proud of that success. Here we come into competition on their own ground with manufacturers who not only have imitative but inventive genius, who not only are past grand masters in the technique of their several trades but unequalled adepts in the broad aspects of international commerce. As merchants (in distinction from manufacturers) they have devoted time, thought and serious study to trade aspects that too many of our American shippers are wofully ignorant of. It follows, therefore, that while the careless or indifferent manufacturer may stumble upon a good business in Germany, permanent and notable success will only be his who organizes his campaign scientifically, systematically, on broad and intelligent lines.

Yesterday I was shown $2,000 worth of American goods lying now, as they have for two years past, useless and unsalable in a large wholesale merchant's warehouse here in Berlin. Why? Because without warning or notice the manufacturer had suddenly made up his mind that red boxes were more attractive than black. Unluckily for the manufacturer, and for his Berlin connection, the German customers had become accustomed to the black boxes and would have none of the red. Therefore the $2,000 worth of goods lies and will lie until the Berlin merchant can get rid of it somehow, for some price. This is only one concrete example of scores of similar instances that I have myself observed in the course of some years' experience. I have even heard American manufacturers who have been in fault in cases of the sort sneer at what they called the "childishness" of the foreigner. But the broad gauge American does not set himself up as a model on a pedestal that all the world may admire and wonder. No! Those American manufacturers who have studied foreign idiosyncrasies and have made the notable successes in foreign business willingly recognize the necessity of catering to customs and habits of thought no less than of person, no matter how strange and absurd they may appear. "Semper idem" is the motto that should invariably rule one's wares destined for any foreign market. If improvements are made the foreign customers should first be consulted.

One German trader in conversation with me the other day asserted that he was constantly importing goods from a certain Wisconsin manufacturer and reshipping from Germany to Cuba and to Mexico, because, as he said, he knew how to ship, had studied the trade as the American manufacturer has not. I laughed, for "one swallow does not make the summer" and similar instances in the trade of every country under the sun are not rare. I mention it as an illustration of the pride the German merchant takes in the study he has devoted to export problems, and the fact is not to be gainsaid that in export business as in the detail of some manufacturing industries the German now leads the world. They lead because they have studied it, studied hard and conscientiously as the German does most things, and they have studied it because they have had to in order to make their country what it is today. "What will American exports be when our people, too, have to study trade as they have never had to yet," said an American consul to me last week, rubbing his hands in glee at the prospect.

There are several considerations that must ever be kept before the attention of American manufacturers seeking a German market. Patents and trade-marks are among the most important. Any article that is patented at home should, if possible, be thoroughly protected in Germany also. The only possible exception to this rule is in the case of goods that can never conceivably be manufactured in Germany or cannot be so cheaply manufactured here as to defy our competition plus freights and duties. But many Americans fail to appreciate the fact that to make a German patent valid it must be "worked" here within three years from its date. That is, the machine or whatever it may be must be manufactured in Germany. Owing to the existence of satisfactory facilities for manufacturing, and that at quite as low cost as in the United States, many of our manufacturers, particularly in machinery, now have established German factories, in many cases largely manned by American foremen. Other manufacturers keep their patents alive by arranging with German establishments to manufacture for them such minimum quantities as will answer legal requirements.

As to trade-marks, it must be remembered that in Germany the rule is "first come, first served." Hans Schmidt, of Dresden, or Max Müller, of Frankfurt, can copyright Standard Oil trade-marks, for instance, if he chooses, if they are not already protected by the originators, or some one else, in Germany. When the copyright here is once obtained the German law jealously protects the man regarded by it as the owner. At least two cases have come within my personal knowledge in recent years where American manufacturers who had begun to develop a good business in Germany but had never given a thought to such a trifle as copyrighting their trade-marks here, awoke one fine morning to find that enterprising Germans had copyrighted those marks *in their own names*. In one of these cases the American concern wished to do away with their old agent, but the first independent importers of the goods were promptly served with legal papers proving ownership in the trade-mark to reside in the former agent and they were forced to return the goods to New York. The old agent still controls that line. The mark was known and wanted—no one else can supply it. In the second case to which I have referred the original American manufacturers were actually cut out of this market, for, in view of the success the goods were meeting with, a German manufacturer made precisely the same thing and stamped his product with the original American mark, which he was shrewd enough to copyright for himself. A large and promising American business was thus nipped in the bud.

It may not be out of place here to remark that those American firms who establish branch houses or offices in Germany usually find it more economical as well as safe to register such branches in the form of German limited liability companies—"Gesellschaft m. b. H." as they are called. I am told that fees for registration are light and that there are no obstacles to the formation of such companies here, for all of the officers may reside in America. An income tax is thus avoided and the interest of the proprietors better safeguarded than is possible under German (and usual European) law when business is done through an agent for a foreign house.

One other matter must be referred to in any review of American business in Germany, and particularly just at this time. This is the new tariff agreement between the United States and Germany. It is perhaps difficult to comment on this subject without drifting into questions of politics, which it is the desire of the AMERICAN EXPORTER to avoid. Without claiming any profound knowledge of the subject I may be permitted to say that two features of the situation are emphasized by Americans engaged in business in Germany. First, Germany was entirely within her rights in withdrawing from the United States the privileges of the "most favored nation" column and, indeed (some people go so far as to say), could hardly be blamed for so doing. Second, that the commercial agreement becoming effective July 1 last was probably the very best that could be done or hoped for under the circumstances. Here in Germany our fellow-Americans feel that the pronounced irritation that has been felt in the United States against Germany because she proposed to alter the old order of things and against the tariff commission, both for what they did and what they failed to do, is entirely unjustified and uncalled for. I may add a concrete and rather interesting expression of the result in one line of American goods seriously affected by the new arrangement and strikingly put to me in this form by the manager of the American department of the largest house in Germany in the line of business indicated. The old duty on the lighter forms of American machine tools entering Germany, machinery up to 500 kilos in weight, I believe, was at the rate of 3 marks per 100 kilos, a mere nothing, equalling an average of only about 1 per cent. on the value of the machines. The new duty on this class of machinery is 20 marks per 100 kilos, which works out equivalent to about 10 per cent. on the value. And yet the expectation seems to be general that we shall continue to do business in Germany even in these light tools in spite of the increase from 1 per cent. to 10 per cent.

MUNICIPAL IMPROVEMENTS IN YOKOHAMA.—Extensive municipal improvements, other than the important harbor developments planned or under way, are soon to be entered upon and should interest various American industries. According to the monthly publication of the Yokohama Chamber of Commerce, the Yokohama waterworks extension will be made public in October. The population of Yokohama is now put at 350,000, and at present the water supply is 18 gallons per capita a day. It is projected to increase this capacity to 25 gallons per capita for 800,000 or 1,000,000 population. It is also planned to extend the waterworks system to Hodogaya and other villages.

CATALOGUES FOR CONSULATE.—The American consulate, Colon, Panama, writes for catalogues and price lists covering the following lines of merchandise: Awning and awning fixtures, barbers' supplies, bicycles, boots and shoes, buggies, cotton goods, crockery and glassware, cash registers, clothing, drugs and chemicals, household and office furniture, men's furnishing goods, hats and caps, hardware, jewelry, cameras.

NOTES FROM THE NETHERLANDS.

AMSTERDAM, August 16, 1907.

Holland is, indeed, a small country, as we often remark in considering fields for the expansion of American foreign trade. And the market would in very truth be but a limited one for us were it not for the very large export trade which Dutch shipping merchants do with their thriving East Indian possessions. Java and Sumatra are strangely unfamiliar words to the ordinary American manufacturer. As a matter of fact they supply Dutch traders with a solid and substantial market of whose importance the world at large has little idea. By way of illustration let me repeat a statement made to me by a large dealer in American steam pumps in Amsterdam. In commenting on the business to the Dutch colonies he remarked that he averaged sales of three of our steam pumps every two days for shipment to the East. How many of our manufacturers have realized that so considerable a market existed, or that Amsterdam and Rotterdam afforded a basis for reaching it? Many other opportunities for the expansion of American trade await our manufacturers in many lines if they will take the necessary measures to cultivate the opportunities. The manufacturer who visits Amsterdam and, perhaps, Rotterdam on the favorite combination trip of pleasure and business learns but little and probably sees nothing of the Dutch export shippers. A fortnight or a month might easily be spent among them and adequate arrangements for the presentation of goods to them, and the supply of samples, when possible, for transmission to colonial connections should form as large a part of our interests in Holland as the purely local trade.

So far as Holland as a market is concerned it may be useful to remind our friends that we last year marketed here almost $100,000,000 worth of American products. Our trade here seems to be in a most healthy condition, even though seriously handicapped for the time being by the universal complaint of greatly belated deliveries and some neglect of the markets' requirements, due to our continued prosperity in the United States. Commercially speaking, from the point of view of export trade, our prosperity is a serious and a dangerous thing for us. The way has already been opened in more than one branch of business for German and English competitors who, altogether apart from considerations of comparative price or quality, possess many and obvious advantages over us which it will be the wise part to discount in every possible manner. Our Dutch customers ought to receive preferential treatment over our home trade, not the contrary, and especial pains should be taken both to urge on the speediest possible shipments and to maintain prices as stable as may be consistent with actual costs of raw materials. European prices, it must be remembered, have not advanced in anything like the proportion that American prices have, and the difference is inexplicable and exasperating to many a Dutch merchant who likes American goods and, as a rule, does not like our German competitors.

NEW INTERNATIONAL POSTAL REGULATIONS.

Of importance to American exporters are the new regulations applying to international postage, especially the reduction in the letter rate.

The following extracts are taken from Bulletin 8,381, issued by the Post Office Department August 21, 1907:

The following principal provisions of the Universal Postal Convention of Rome applicable to articles mailed in the United States on and after October 1, 1907, addressed for delivery in foreign countries, except Canada, Mexico, Cuba and the Republic of Panama, are published for the information and guidance of postal officials and the public:

The postage rates (except the rate applicable to letters) remain unchanged. They are as follows:

For "*letters,*" five (5) cents for the first ounce, and three (3) cents for each additional ounce or fraction of an ounce; prepayment optional.

For "*postal cards,*" single, two (2) cents; double, four (4) cents each.

For "*commercial papers,*" five (5) cents for the first ten (10) ounces *or less,* and one (1) cent for each additional two (2) ounces or fraction of two (2) ounces. Limits of size and weight the same as for "prints." The packages must not be closed against inspection.

For "*samples of merchandise,*" two (2) cents for the first four (4) ounces *or less,* and one (1) cent for each additional two (2) ounces or fraction of two (2) ounces. Limit of weight, twelve (12) ounces; limit of size, twelve (12) by eight (8) by four (4) inches. The packages must not be closed against inspection.

For "*prints*" of every kind, one (1) cent for each two (2) ounces or fraction of two (2) ounces. Limit of weight, four (4) pounds six (6) ounces; limit of size, eighteen (18) inches in any direction; except that when rolled the package may measure thirty (30) inches in length by four (4) inches in diameter. The packages must not be closed against inspection.

Postage upon all articles, other than letters, must be prepaid at least in part. Double the amount of the deficient postage calculated at the above rates, is collectible upon the delivery of articles upon which postage has not been prepaid in full.

In the case of short-paid articles of any kind returned to the senders as undeliverable, the senders must pay the amount which would have been collected of the addressees if the article had been delivered.

Commercial papers consist of articles written or drawn wholly or partly by hand which have not the nature of personal correspondence, such as deeds, invoices, insurance papers, etc.—including manuscript for publication, manuscript music, original and corrected tasks of pupils, excluding all comments on the work.

Samples of merchandise must conform to the following conditions, viz.:

They must be placed in bags, boxes or removable envelopes, in such manner as to permit of *easy* inspection.

They must not have any salable value, nor bear any manuscript other than the name and social position of the sender, the address of the person for whom they are intended, a manufacturer's or trademark, numbers of order, prices and indications relating to weight, size and quantity to be disposed of, or those necessary to precisely indicate the origin and nature of the merchandise.

Articles of glass, liquids, oils, fatty substances, dry powders, as well as live bees, are admitted to the mails as "samples," provided they are packed in the following manner:

Articles of glass must be packed solidly in boxes of metal or wood in a way to prevent all damage to other articles or the employees.

Liquids, oils and substances easily liquefiable must be enclosed in glass bottles hermetically sealed. Each bottle must be placed in a wooden box filled with spongy material sufficient to absorb the liquid in case the bottle should be broken. Finally, the box itself must be enclosed in a case of metal or wood with a screw top, or of strong and thick leather.

Prints of all kinds are subject to the following conditions:

Stamps and other forms of prepayment, whether canceled or not; prints constituting the sign of monetary value, articles the text of which has been altered after printing except as indicated below, are not mailable at the postage rate applicable to "prints."

Facsimile copies of manuscript or typewriting—if sent as prints—must be mailed at post office windows in not less than twenty (20) perfectly identical copies.

Additions (by hand or other means) may be made to *"prints"* as follows:

On the outside of the package or on the print itself, the name, business and residence of the sender, and date of despatch; to correct errors, cross out certain parts and make prominent by means of marks, certain parts of the text; to add the "copy" to the "proof," and to make changes in and additions to the proof on separate sheets if necessary; to add to clippings from periodicals, the title, date, number and address of the periodical; to insert figures in price-lists, offers for advertisements, stock quotations, trade circulars and prospectuses, as well as the name of the traveler, the date, and the name of the locality through which he expects to pass, on notices of that kind; to add on notices relating to the movements of vessels, the dates of sailings and arrivals, as well as the names of the vessels; to add to notices of shipment, the date of shipment.

No manuscript additions other than those indicated above are allowed upon prints.

Prints must be wrapped so that the contents may be *easily* examined without damaging the cover. But *cards* need not be enclosed unless they are embellished by means of mica, ground glass or a similar substance.

Cards bearing the title "postal card" or its equivalent are admissible to the mails at the postage rate applicable to "prints," provided they conform to the general conditions prescribed therein for "prints." If they do not conform to those conditions, they must be treated as postal cards.

The following articles are prohibited circulation in international mails, viz.:

Articles which do not conform to the conditions prescribed for them.

Articles which may be dangerous, or likely to soil or damage other articles.

Articles liable to customs duty.

Any article the introduction and circulation of which is prohibited by the laws of the country of destination:

Articles addressed by initials, or in pencil, are not allowed to be registered.

Packages of prints destined for delivery in Persia or at native post offices in the Empire of China, are subject on delivery to additional postal charge equal to one cent, without regard to the amount of postage prepaid thereon.

Unpaid or short-paid registered articles must be delivered to addresses without charge.

A "reply coupon" may be purchased (price six (6) cents) at post offices, which upon presentation at a post office will entitle the person presenting it to receive (without charge) a postage stamp of that country equivalent in value to a 5-cent United States postage stamp. By this arrangement a person in the United States can furnish his correspondent in either of said countries with a postage stamp with which to prepay postage on a reply to his letter. The countries in which the reply coupon is invalid are:

Madagascar, Mayotte, Mobele and French establishments in India; Orange River, Antigua, Barbados, Bermuda, Cyprus, Falkland Islands, British Guiana, Jamaica, Southern Nigeria, Sarawak, Trinidad and Zanzibar.

FOREIGN TRADE NOTES.

The Natal Estimates: Looming Orders.—The estimates of the Natal Government for the financial year ending June, 1908, include a number of items which are likely to bring a crop of good orders. Among these may be mentioned the following: Telegraph and telephone construction, £5,250; automatic sprinklers for Government buildings, £1,800; development and improvement of railways and railway buildings, £124,000; construction of railways, £180,000, of which £60,000 is set down for the Natal-Cape line, and £120,000 for branch lines; harbor works, £64,675, which includes provision for electric light and power extension, cranes, coaling plant, etc., and public works and buildings, £37,750. The expenditure under all these heads is, of course, much less than was provided for in the last financial year, and shows the stringency with which all the South African Governments are cutting down expenses. The detailed estimates of the other colonies are not yet to hand, but they will doubtless furnish our manufacturers with much that is of interest.

Catalogues for Consulate.—The American Consulate at Antung, China, requests American manufacturers to forward their catalogues, preferably illustrated ones, that they may be filed at the consulate for reference. The consulate writes that it should be possible to create a market there for many lines of goods which are more or less in demand now, and requests as varied a line of catalogues and literature as can be furnished it.

The Mitsu Bishi Engine Works, Nagasaki, Japan, has decided to construct a floating dock, with a capacity for vessels of 12,000 tons displacement. The dock will cost $750,000 gold. About 5,000 tons of iron material are required for its construction. Of the amount, 4,000 tons have been ordered from the Edamitsu Iron Foundry, and the rest from an English iron foundry. It will be completed the year after next.

DEVELOPMENT IN PANAMA.

Consul James C. Kellogg, reporting from Colon, states that the port of Bocas del Toro will in a few years become one of well recognized importance in Central America. He writes: The nearness of the harbor of Bocas del Toro to Colon, and therefore to the Isthmian Canal Zone, makes it very likely that such fine bodies of water as the Chiriqui and Almirante bays will be utilized during and after the construction of the great Isthmian waterway. The bay of Chiriqui extends from Bocas del Toro to its farthest point, about 60 miles, and is about 12 miles wide. It is a safe harbor for vessels in all kinds of weather and can accommodate a great number at a time. Another reason why Bocas del Toro will become of more importance is that it is the most northern port of Panama on the Atlantic Ocean side, its northern limit being the boundary line between Panama and Costa Rica.

NEW CONTRACTS.

Advance Information on Important Projects Which Will Require American Machinery, Equipment and Supplies.

NEW CUBAN RAILROAD PROJECT.

The Yu-Muri Railway and Tramway Company is the title of a new concern which plans to build about 150 miles of new lines in Cuba. Initially the road will serve as a mode of transportation for the large quantities of bananas, pineapples, cocoa and hardwoods which now cannot be profitably marketed because of the very primitive means of communication between the interior points in the north of the Province of Santiago and Baracoa—the principal port in that part of the world. Later on the road is to be extended to Guantanamo, and then on to Santiago.

Construction work on the first Baracoa section—about 10 miles—will begin within a few weeks, and contracts will be let here for equipment, etc. Among the people principally interested here are the shipping house of Walford & Co., 10 Bridge street, New York.

The company will be incorporated under the laws of the State of New York within the next few days. The capital will be $1,200,000.

J. J. Wetmore, of Philadelphia, brother of Moses C. Wetmore, the St. Louis banker, is also largely concerned in the project. Mr. Wetmore while here makes his headquarters at the offices of Arthur Giesler, consulting engineer, Columbia Building, 29 Broadway.

TWELVE THOUSAND HORSE POWER MEXICO POWER PROJECT.

The Michoacan Power Company, formed in the interest of the Guanajuato Power and Electric Company, which owns an 8,000 horse power hydro-electric plant on the Duero River near Zamora in the State of Michoacan, Mexico, and supplies the Guanajuato mining region with power, plans to build two big plants on the Angulo River. The necessary concessions have already been acquired from the Mexican Federal Government. The combined capacity of these plants will be 12,000 horse power, and what is known as the Moriega concession permits of the utilization of sufficient water to generate 8,000 horse power, while another concession—the Brunel—carries the privilege of constructing a 4,000 horse power station. In connection with these projects a 90 mile transmission line will be built, which will convey the electric energy to Guanajuato.

Henry Hine, formerly general manager of the Stanley Electric Manufacturing Company, of Pittsfield, Mass., which concern is one of the General Electric Company's affiliations, is president of the company. Among others largely interested in the scheme are John Hays Hammond, of the Guggenheim interests, who is vice president, and Chas. A. Coffin, president of the General Electric Company, which concern is also primarily concerned in the enterprise. The New York offices of the Guanajuato-Michoacan interests are in the Hanover National Bank Building. The purchases will aggregate fully $1,500,000.

MORE EQUIPMENT FOR BIG CUBAN SUGAR PLANTATIONS.

The Cuban-American Sugar Company, which controls on behalf of the American Sugar Refining Company six of the big sugar plantations in Cuba, is planning the practical doubling of the capacity of the Chaparra factory, the largest on the island. This will mean the expenditure of nearly $2,000,000 in equipment, all of which is expected to be purchased in the United States. Chas. Hedeman, the general manager of the Honolulu Iron Works, is now on his way to Cuba for the purpose of submitting a report to the interests here, and shortly after he returns to New York, which will be in about three weeks' time, the orders for additional machinery will begin to be placed.

R. B. Hawley, ex-Congressman of Texas, is president of the Cuban-American Company. Samuel Vickees is the New York consulting engineer. The New York offices, through which the orders will be placed, are at 107 Front street.

EQUIPMENT FOR NICARAGUAN RAILWAYS.

The Nicaragua Government Railways will be in the market shortly for rails, locomotives, cars, etc. The orders will be placed direct by the Ministry of Public Works, Managua, according to the statement of Pio Bolanos, the Nicaraguan Consul General, 66 Beaver street.

EQUIPMENT FOR NATIONAL TEHUANTEPEC RAILWAY.

The National Tehuantepec Railway, which is jointly controlled by the Mexican Government and by the British contracting firm of S. Pearson & Son, Limited, who built it, is now purchasing additional equipment here in order to take care of the rapidly increasing traffic across the Isthmus. The contracts are being closed through Carr Brothers, with offices in the Hudson Building, 32 Broadway. Eight locomotives have been ordered from the Baldwin Locomotive Works, and contracts are pending for 200 cars.

EQUIPMENT FOR GUATEMALA NORTHERN RAILWAY.

The Guatemala Northern Railway, which is being built by an American-Canadian syndicate, in which Sir William Van Horne, chairman of the board of directors of the Canadian Pacific Railroad; Minor C. Keith, vice-president of the United Fruit Company, and William Lanman Bull, of the New York banking house of Edward Sweet & Co., are among the prominent members, is now purchasing equipment here.

A contract for 200 cars—100 flat and 100 box—has been placed with the Pressed Steel Car interests. The cars will be constructed at the Anniston, Ala., shops for the Western Car and Foundry Company.

The New York offices of the Guatemala Company are at 80 Broadway, the same offices which do the purchasing for the Cuba Company, owner of the Cuba Central Railroad.

PORTO RICO SUGAR PLANT TO BE DOUBLED.

The San Cristobal Sugar Company, of New York, and the parent company of the two Porto Rico operating concerns, the Centrale San Cristobal (the sugar factory end) and the San Cristobal Land Company (the cane growing branch), has decided to double the capacity of the plant, which has a capacity of 500 tons of cane per day. The present equipment includes Birmingham mills, evaporators and fans, Hepworth centrifugals, Grey cane unloaders and Guild & Harrison pumps.

F. E. Church, of the Church & Dwight Company, 63 Wall street, is president of the land company.

P. G. Mumford, president of the Centrale San Cristobal and general manager of the properties in Porto Rico, is now in New York regarding the placing of the principal contracts. The offices of the company are at 106 Wall street. The supplies, etc., will be purchased through W. C. King, of the General Chemical Company, 25 Broad street.

MEXICAN POWER PROJECT.

The Compania Electrica Irrigadoro en el Estado de Hidalgo, S. A., plans to expend about $1,500,000 in the additional development of power for various mining and industrial purposes, and contracts will shortly be awarded for the necessary equipment for a hydro-electric plant to develop 6,000 horse power. These mines, among the largest in Mexico, are now being operated by a Boston syndicate, of which ex-Mayor Quincy is a member.

FORTY THOUSAND HORSE POWER MORE FOR NECAXA.

The Mexican Light and Power Company, which operates the largest horse power in Mexico, has decided to increase its capacity by 40,000 horse power. Additions are to be made at Necaxa for the purpose of generating further electric energy for transmission to Mexico City, also to the El Oro mining camp and several intermediary points. No less than 250 miles of lines will be put in operation, which will be the longest transmission system in existence in the Western Hemisphere. These extensions, including power house equipment, will mean an expenditure of fully $5,000,000. The Mexican company is controlled by a strong American-Canadian syndicate, in which Frederic S. Pearson, formerly chief engineer of the Metropolitan Street Railway here, is a dominant factor.

It is said that nearly $50,000,000 will be invested in the undertaking before plans have been developed in their entirety.

The company now owns the Mexico City electric traction system and the lighting plants there. The equipment installed in the Necaxa plant includes water turbines built by Escher, Wyss & Co., Zurich; generators made by the Siemens-Halske Company, and General Electric transformers.

The steel for the building came from Pittsburg, the Riter-Conley Manufacturing Company having taken the contract for the complete construction of the plant.

One of the reasons why German generators are installed is understood to be because it was stipulated that when the Mexican company purchased the Mexico City lighting and power plant owned by Siemens-Halske the latter concern was to get the generator contract. As there will be no restrictions of a similar description in the pending contracts, it is expected that Americans will be to the fore. It would be well not to forget the fact that Europeans and Americans meet on an equal basis as regards tariff.

The New York purchasing agent of the Mexican Light and Power Company is W. B. Plummer, whose office is in the Broad-Exchange Building.

RAILROAD EQUIPMENT FOR PERU.

The Ferrocarril de Ho a Moquegua, Peru, which line has been lying dormant for some time past, is about to be put in operation again, with the result that new equipment will be purchased. Eduardo Higginson, Consul-General for Peru here, whose offices are in the Broad-Exchange Building, has just placed a contract with the American Locomotive Company.

NEW NICARAGUAN PROJECT.

A number of interesting contracts for various material are expected to be placed in this country shortly by a European syndicate which has acquired extensive railroad, mining and agricultural concessions in Nicaragua. Among those interested in the project is James Deitrick, who is now on the other side, but who will be back here within a week or two, according to private advices, ready to take up the matter of closing contracts, as the financial arrangements have now been completed for the development of the different franchises secured from the Government of Niacaragua.

FOREIGN TRADE OPPORTUNITIES.

Specific inquiries from foreign subscribers and readers of the American Exporter for American machinery and goods are referred direct to advertisers of the publication in the line to which the inquiry belongs. In some cases, however, inquiries are received for lines not represented in the advertising columns of the American Exporter, or for goods which the advertisers cannot at the time supply.

The names and addresses of the following prospective customers will be given to responsible manufacturers on application, giving the number:

543. Celluloid Machinery.—Buenos Aires manufacfacturer wishes to receive catalogue and price lists from manufacturers of machines and supplies for making celluloid and horn combs; also from manufacturers of celluloid.

544. Paper Making Machinery.—Colombia Cabinet officer desires catalogues of paper making machinery.

545. Tar.—Brazilian importer asks for prices of D. E. F. and G. H. tar, these being the qualities most in demand there.

546. Card Machinery.—Rotterdam importer desires to communicate with manufacturers of machines for making cards used in card index system.

547. Sawmill Machinery.—Cuban planter is in the market for sawmill machinery, planing machine, band saw and machine for mortising cart hubs.

548. Druggists' Supplies.—Porto Rican house wishes trade literature on druggists' glassware, paper boxes, labels and chrome litographs.

549. Shoe Leather.—Canary Islands importer desires to hear from exporters of fine shoe leather.

550. Laundry Machinery.—Spanish firm wishes to communicate with manufacturers of machinery for ironing clothes with a gloss.

551. Toothpick Machinery.—Porto Rican house is anxious to communicate with manufacturers of machines for making toothpicks.

552. Preserve Machinery.—Chile business man wishes to receive catalogues from manufacturers of machines for making preserves.

553. Candy.—A Venezuelan desires catalogues of manufacturers of candy and fancy boxes.

554. Ice Cream Freezer.—Cuban merchant desires to purchase a freezer for making ice cream to be sold in brick form and covered with paper.

555. Woolen Cloth.—Cuban importer desires to enter into negotiations with a large export house of woolen cloth for making men's clothing.

The following foreign trade opportunities are selected from the Reports of the Bureau of Manufacturers, Department of Commerce and Labor. The Bureau will furnish names to manufacturers on request:

No. 1,476. School Furniture.—An American consul in a Balkan country states that American exporters should be able to induce the minister of education there to purchase a considerable amount of modern furniture for the schools of the city in question. At present wooden benches, made by local carpenters, are used, and the blackboards, which are of primitive design, are also of domestic construction. One firm there, dealing in school supplies and furniture, would like to correspond in German with American manufacturers in regard to terms and prices.

No. 1,477. Gas Mantles.—One of the American consuls in the Levant writes that at present all the gas mantles used by the company supplying gas to the city in question are imported from England, France and Germany, and vary in price from 5 to 25 cents each, according to quality, inclusive of freight and duty. The officials of the gas company have expressed their willingness to also use mantles of American make, if the makers of them can compete in price.

No. 1,480. Fire Extinguishers.—An inquiry has been received at one of the American consulates in Asia Minor in regard to chemical fire extinguishers, such as hand grenades, etc. The consulate requests manufacturers of these appliances to send their catalogues in triplicate that they may be shown to interested inquirers.

No. 1,489. Fiber Handling and Electric Power Machinery.—An American consul in Eastern Africa forwards the information that a concession has been recently granted a business man there who is about to engage in the business of furnishing electric power and fiber handling machinery. He would like to interest American capitalists and manufacturers of electrical and fiber machinery in his undertaking.

No. 1,491. Goods for Persia.—One of the American consuls in Persia writes of the formation of an American Citizens' Co-operative Association in Persia. He suggests a market for American shoes and plows particularly.

No. 1,494. Tobacco Cultivators.—An American consul in South America writes that a business man at the place in question would like to hear from American manufacturers of tobacco cultivators and implements used in the treating of tobacco.

No. 1,497. Motors for Automobiles.—A business man in Germany writes to the Bureau of Manufactures that he would like to correspond with American makers of motors for automobiles, he having in mind a factory requiring thirty motors a month.

No. 1,486. Leather.—An American consul in Asiatic Turkey forwards the names of dealers in a certain city there who would be glad to receive samples and prices of American leather. He also sends the name of a French firm which sells the largest quantity of leather to that city.

SAILING DATES

NEW YORK SAILINGS

TO LIVERPOOL

CELTIC, White Star Line	Oct. 17
LUSITANIA, Cunard Line	" 19
VICTORIAN, White Star Line	" 22
CARONIA, Cunard Line	" 22
ARABIC, White Star Line	" 24
UMBRIA, Cunard Line	" 26
BOVIC, White Star Line	" 29
BALTIC, White Star Line	" 31
CAMPANIA, Cunard Line	Nov. 2
CEVIC, White Star Line	" 5
CARMANIA, Cunard Line	" 5
CEDRIC, White Star Line	" 7
LUCANIA, Cunard Line	" 9
ARMENIAN, White Star Line	" 12
CELTIC, White Star Line	" 14
LUSITANIA, Cunard Line	" 16

TO LONDON

MINNETONKA, Atlantic Trans. Line	Oct. 19
MINNEAPOLIS, Atlantic Trans. Line	" 26
MINNEHAHA, Atlantic Trans. Line	Nov. 2
CESTRIAN, Atlantic Trans. Line	" 9
MINNETONKA, Atlantic Trans. Line	" 16

TO SOUTHAMPTON

PHILADELPHIA, American Line	Oct. 19
OCEANIC, White Star Line	" 23
ST. Paul, American Line	" 26
MAJESTIC, White Star Line	" 30
NEW YORK, American Line	Nov. 2
ADRIATIC, White Star Line	" 6
ST. LOUIS, American Line	" 9
TEUTONIC, White Star Line	" 13
PHILADELPHIA, American Line	" 16

TO GLASGOW

COLUMBIA, Anchor Line	Oct. 19
CALIFORNIA, Anchor Line	" 26
CALEDONIA, Anchor Line	Nov. 2
FURNESSIA, Anchor Line	" 9

TO BRISTOL

LLANDAFF CITY, Bristol City Line	Oct. 19
KANSAS CITY, Bristol City Line	" 25
WELLS CITY, Bristol City Line	Nov. 1

TO MANCHESTER

TERENCE, Lamp. & Holt	Nov. 2

TO BALTIC PORTS

C. F. TIETGEN, Scan.-Am. Line	Oct. 17
OSCAR II, Scan.-Am. Line	" 24
HELLIG OLAV, Scan.-Am. Line	Nov. 7

TO HAMBURG

AMERIKA, Ham. Am. Line	Oct. 17
PATRICIA, Ham. Am. Line	" 19
DEUTSCHLAND, Ham. Am. Line	" 24
PRESIDENT LINCOLN, Ham. Am. Line	" 26
KAISERIN AUG. VICTORIA, Ham. Am. Line	" 31
GRAF WALDERSEE, Ham. Am. Line	Nov. 2
BLUECHER, Ham. Am. Line	" 7
PENNSYLVANIA, Ham. Am. Line	" 9
A STEAMER, N. Y. & Continental Line	" 10
AMERIKA, Ham. Am. Line	" 14
PRESIDENT GRANT, Ham. Am. Line.	" 16

TO NEWCASTLE AND LEITH

A STEAMER, Wilson Line	Oct. 23

TO HULL

CONSUELO, Wilson Line	Oct. 26
TORONTO, Wilson Line	Nov. 2
MARTELLO, Wilson Line	" 9

TO BREMEN

MAIN, North German Lloyd	Oct. 17
KAISER WM. DER GROSSE, North German Lloyd	" 22
BARBAROSSA, North German Lloyd	" 24
KAISER WILHELM II, North German Lloyd	" 29
GROSSER KURFUERST, North German Lloyd	" 31
KRONPRINZ WILHELM, North German Lloyd	Nov. 5
PRINCESS IRENE, North German Lloyd	" 7
KRONPRINZESSIN CECILIE, North German Lloyd	" 12
GNEISENAU, North German Lloyd	" 14

TO ANTWERP

FINLAND, Red Star Line	Oct. 19
MOHAWK, Phoenix Line	" 23
VADERLAND, Red Star Line	" 26
KROONLAND, Red Star Line	Nov. 6
ST. CUTHBERT, Phoenix Line	" 9
SAMLAND, Red Star Line	" 13

TO ROTTERDAM

KOREA, Russian East Asiatic Line	Oct. 17
NEW AMSTERDAM, Holland-Am. Line.	" 23
KHERSON, Russian Volunteer Fleet	" 24
ESTONIA, Russian East Asiatic Line	" 30
STATENDAM, Holland-Am. Line	" 30
NOORDAM, Holland-Am. Line	Nov. 6
SMOLENSK, Russian Volunteer Fleet	" 7
A STEAMER, N. Y. & Continental Line.	" 10
RYNDAM, Holland-Am. Line	" 13
LITUANIA, Russian East Asiatic Line	" 13

TO DUNKIRK

HUDSON, French Line	Oct. 26

TO HAVRE

A STEAMER, Barber Line	abt Oct. 17
LA TOURAINE, French Line	" 17
LA LORRAINE, French Line	" 24
LA BRETAGNE, French Line	" 26
LA SAVOIE, French Line	" 31
LA PROVENCE, French Line	Nov. 7
LA GASCOGNE, French Line	" 9
MEXICO, French Line	" 9
LA TOURAINE, French Line	" 14

TO BORDEAUX

TRIGNAC, Bordeaux Line	end Oct.

TO MARSEILLES

ROMA, Fabre Line	Nov. 2

TO MALTA, VENICE AND TRIESTE

LAURA, Austro-Am. S. S. Co	Oct. 23
SLAVONIA, Cunard Line	" 24
ALICE, Austro-Am. S. S. Co	" 31
ULTONIA, Cunard Line	" 31
PANNONIA, Cunard Line	Nov. 14

TO ITALIAN AND MEDITERRANEAN PORTS

KOENIG ALBERT, North German Lloyd.	Oct. 19
LUISIANA, Lloyd Italiano	" 19
CAMPANIA, Nav. Gen. Italiana	" 22
LAURA, Austro-Am. S. S. Co	" 23
NORD AMERICA, La Veloce Line	" 23
REPUBLIC, White Star Line	" 24
SLAVONIA, Cunard Line	" 24
PERUGIA, Anchor Line	" 26
NECKAR, North German Lloyd	" 26
GERMANIA, Fabre Line	" 26
BULGARIA, Ham. Am. Line	" 29
RE D'ITALIA, Lloyd Sabaudo	" 29
EUROPA, La Veloce Line	Oct. 30
ALICE, Austro-Am. S. S. Co	" 31
ULTONIA, Cunard Line	" 31
ROMA, Fabre Line	Nov. 2
FRIEDR. DER GROSSE, North German Lloyd	" 2
LIGURIA, Nav. Gen. Italiana	" 5
HAMBURG, Ham. Am. Line	" 5
CRETIC, White Star Line	" 7
ALGERIA, Anchor Line	" 9
NEAPOLITAN PRINCE, Prince Line	" 11
PANNONIA, Cunard Line	" 14

TO CADIZ AND BARCELONA, ETC.

LOVSTAKKEN, Gans S. S. Co	Oct. 20
RHODESIAN, Fabre Line	" 20
NEUSTRIA, Fabre Line	" 26

TO CUBA AND MEXICO

ESPERANZA, Ward Line	Oct. 17
VIGILANCIA, Ward Line	" 18
SARATOGA, Ward Line	" 19
OLINDA, Munson Line	" 23
MEXICO, Ward Line	" 24
HAVANA, Ward Line	" 26
PALOMA, Munson Line	" 30
MONTEREY, Ward Line	" 31
SEGURANCA, Ward Line	Nov. 1
SARATOGA, Ward Line	" 2
CURITYBA, Munson Line	" 6
MERIDA, Ward Line	" 7
HAVANA, Ward Line	" 9
CUBANA, Munson Line	" 13
ESPERANZA, Ward Line	" 14

TO COLON

LA PLATA, Royal Mail S. P. Co	Oct. 19
PRINZ SIGISMUND, Ham.-Am.-Atlas Line	" 19
DUNOTTAR CASTLE, Panama R. R. Line	" 21
FINANCE, Panama R. R. Line	" 25
ALTAI, Ham.-Am.-Atlas Line	" 26
COLON, Panama R. R. Line	" 31
PRINZ EITEL FRIEDRICH, Ham.-Am.-Atlas Line	Nov. 2
TAGRES, Royal Mail S. P. Co	" 2
ADVANCE, Panama R. R. Line	" 6
VENETIA, Ham.-Am.-Atlas Line	" 9
PANAMA, Panama R. R. Line	" 11

TO PARA AND MANAOS VIA BARBADOS

POLYCARP, Booth S. S. Line	Nov. 5
MARANHENSE, Booth S. S. Line	" 25

TO RIVER PLATE-MONTEVIDEO, BUENOS AIRES AND ROSARIO

CASILDA, Norton Line	Oct. 25
HILARIUS, Houston Line	" 25
A STEAMER, Barber Line	" 25
PHIDIAS, Lamp. & Holt	Nov. 4
A STEAMER, Barber Line	" 10
TUDOR PRINCE, Prince Line	" 12

TO RIO JANEIRO, SANTOS AND SOUTH AMERICAN PORTS

HANSEAT, Lloyd Brazileiro	Oct. 25
QUEEN ELEANOR, Howard, Holder & Rowatt	" 25
GUNTHER, Sloman Line	Nov. 1
BYRON, Lamp. & Holt	" 4

TO PORTO RICO

ZULIA, Red D line	Oct. 19

RED D LINE and N. Y. & P. R. S. S. Line alternate every Saturday for San Juan.

TO SOUTH AFRICA

CORFE CASTLE, Norton Line..........Oct. 30
HORATIUS, Houston Line............end Oct.

TO HALIFAX, NOVA SCOTIA, ST. JOHNS, N. F.

ROSALIND, Red Cross Line............Oct. 18
SILVIA, Red Cross Line................ " 25
ROSALIND, Red Cross Line...........Nov. 5

TO AUSTRALIA AND NEW ZEALAND

ELVASTON, U. S. & Aust. Line........Oct. 22
HAWKES BAY, Tyser Line............ " 26
DEN OF MAINS, Am. & Aust. Line.... " 30
VIENNA, U. S. & Aust. Line..........Nov. 15

TO CHINA AND JAPAN

BLOEMFONTEIN, Am. & Manchurian Line ....Oct. 19
ST. PATRICK, Barber Line............ " 20
KORANNA, Am. & Manchurian Line... " 30
HOHENFELS, Am. & Asiatic Line.....Nov. 10

NEWPORT NEWS AND NORFOLK SAILINGS

TO LIVERPOOL

POWHATAN, C. & O. S. S. Line...abt Oct. 30

TO LONDON

BIRMINGHAM, C. & O. S. S. Line..abt Oct. 20

TO ROTTERDAM AND AMSTERDAM

THEMISTO, Holland-Am. Line.........Nov. 5

TO GLASGOW

ALMORA, Donaldson Line.............Oct. 30

TO HAMBURG

ALBANO, Union Line..................Nov. 2

PHILADELPHIA SAILINGS

TO LIVERPOOL

Loading at Penna. R. R. Piers—Washington Ave. Wharf.

FRIESLAND, American Line..........Oct. 19
MERION, American Line............... " 26
WESTERNLAND, American Line......Nov. 2

TO ANTWERP

Loading at Penna. R. R. Piers—Washington Ave. Wharf.

MARQUETTE, Red Star Line..........Oct. 18
MANITOU, Red Star Line.............Nov. 1

TO LONDON

Loading at Penna. R. R. Piers—Washington Ave. Wharf.

MONTANA, Atlantic Trans. Line.......Oct. 23
MINNESOTA, Atlantic Trans. Line....Nov. 13

Loading at Phila. & Reading Ry. Piers—Port Richmond.

CROWN POINT, Phila. Trans-Atl. Line.Oct. 9
EAGLE POINT, Phila. Trans-Atl. Line. " 19
EAST POINT, Phila. Trans-Atl. Line...Nov. 2

TO HAMBURG

Loading at Penna. R. R. Piers—Washington Ave. Wharf.

BARCELONA, Ham. Am. Line.........Oct. 30
PISA, Ham. Am. Line................. " 21
ANDALUSIA, Ham. Am. Line.......... " 31
MACEDONIA, Ham. Am. Line..........Nov. 11

TO GLASGOW, SCOTLAND, AND ST. JOHNS, N. F.

Loading at Pier 24. North Wharves.

SIBERIAN, Allan Line.................Oct. 19
MONGOLIAN, Allan Line..............Nov. 2

TO MANCHESTER

Loading at Phila. & Reading Ry. Piers—Port Richmond.

MANCHESTER COMMERCE, Phila.-Manchester Line....................Oct. 19
MANCHESTER CORPORATION, Phila.-Manchester Line....................Nov. 2

TO ROTTERDAM

Loading at Penna. R. R. Piers—Washington Ave. Wharf.

SOESTDYK, Holland-Am. Line.........Oct. 25
SLOTERDYK, Holland-Am. Line.......Nov. 8

Loading at Phila. & Reading Ry. Piers.—Port Richmond.

CIMBRIA, Cosmopolitan Line...........Oct. 12
EUXINIA, Cosmopolitan Line........... " 19
DANIA, Cosmopolitan Line.............. " 31

TO COPENHAGEN, CHRISTIANIA AND STETTIN

Loading at Phila. & Reading Ry. Piers.—Port Richmond.

GRANARIA, Cosmopolitan Line.........Oct. 31

TO COPENHAGEN

Loading at Penna. R. R. Piers—Washington Ave. Wharf.

ARKANSAS, Scan.-Am. Line...........Oct. 20

BALTIMORE SAILINGS

TO LONDON

MOBILE, Atlantic Trans. Line..........Oct. 23

TO HAMBURG

BOSNIA, Ham. Am. Line.............Oct. 19
TRONTO, Ham. Am. Line.............. " 30

TO BELFAST, DUBLIN AND CARDIFF

LORD LANSDOWNE, Lord Line (*Belfast*) ....Oct. 30

TO ROTTERDAM AND AMSTERDAM

DURANGO, Neptune Line..............Oct. 26
OHIO, Neptune Line...................Nov. 2

TO GLASGOW

ALMORA, Donaldson Line..........abt Oct. 30

TO ANTWERP

BARNESMORE, Puritan Line..........Oct. 18
MOBILE, Red Star Line............... " 23

TO BREMEN

HANNOVER, North German Lloyd... .Oct. 19
RHEIN, North German Lloyd........... " 30

TO LIVERPOOL

TEMPLEMORE, Johnston Line........Oct. 10
QUERNMORE, Johnston Line.......... " 26
ULSTERMORE, Johnston Line.........Nov. 2

BOSTON SAILINGS

TO LIVERPOOL

SAGAMORE, Warren Line.............Oct. 19
SYLVANIA, Cunard Line.............. " 22
WINIFREDIAN, White Star Line....... " 23
MICHIGAN, Warren Line.............. " 26
SAXONIA, Cunard Line................ " 29
BOHEMIAN, Leyland Line............. " 30
CYMRIC, White Star Line.............Nov. 6
SACHEM, Warren Line............... " 9
IVERNIA, Cunard Line............... " 12
DEVONIAN, Leyland Line............. " 13

TO LONDON

ANGLIAN, Wilson & Furness-Leyland Line ....Oct. 18
PHILADELPHIAN, Wilson & Furness-Leyland Line......................... " 25
CAMBRIAN, Leyland Line............Nov. 1

TO GLASGOW

LAURENTIAN, Allan Line............Oct. 18
NUMIDIAN, Allan Line...............Nov. 1

MONEYS AND MEASURES.

The following are the values in United States gold coin of the leading foreign coins in use in the principal commercial countries of the Orient, as declared by the Director of the Mint, January 1, 1907:

Spain—Peseta	$0.193
France—Franc	.193
Germany—Mark	.238
Netherlands—Florin	.402
Chinese Empire—Haikwan Tael	.85
Japan—Yen	.498
India—Rupee	.324
Philippine Islands—Peso	.50
Russia—Ruble	.515
Siam—Tical	.27
Mexican—Dollar	.554
Straits Settlements—Dollar	.568
Hongkong—Dollar	.55

Argentine Republic	Peso.	$0.965
Bolivia	Boliviano.	.484
Brazil	Milreis.	.546
Central American States—		
Costa Rica	Colon.	$0.465
Guatemala	Peso.	.484
Honduras		
Nicaragua		
Salvador		
Chile	Peso.	.365
Colombia	Dollar.	1.000
Ecuador	Sucre.	.487
Haiti	Gourde.	.965
Panama	Balboa.	1.000
Peru	Libra.	4.866½
Uruguay	Peso.	1.034
Venezuela	Bolivar.	.193

A picul, a current measure of weight in China, Japan and the East Indies, equals 133⅓ pounds, avoirdupois. A Chinese tael, as a measure of weight, equals 1⅓ ounces. A catty equals 1⅓ pounds. A Chinese li is about one-third of a mile and a mow is one-sixth of an acre. A Japanese kin equals 1,325 pounds.

EXPRESS TARIFF FOR PACKAGES FROM ONE POUND UP.

From NEW YORK to Lbs.	1	2	5	10	15	20	30	40	50	60	70	80	90	100	Ea. Adl. 100	Ins. Per $100
Hamburg, Bremen	$0.20	.35	.45	.55	.75	.95	1.25	1.50	1.75	1.90	2.15	2.30	2.40	2.50	1.00	.30
Berlin, Leipzig, Hanover	.40	.45	.60	.75	1.00	1.50	1.60	1.95	2.25	2.55	2.85	3.00	3.15	3.25	1.50	.40
All other places in Germany	.45	.55	.75	1.00	1.20	1.50	1.85	2.15	2.45	2.75	3.00	3.20	3.35	3.50	1.75	.40
Liverpool	.20	.35	.45	.60	.70	.90	1.20	1.50	1.75	1.95	2.15	2.30	2.40	2.50	1.00	.30
London, Glasgow	.35	.45	.55	.75	.90	1.10	1.50	1.90	2.25	2.50	2.75	3.00	3.25	3.50	1.80	.40
All other places in Great Britain and Ireland	.45	.55	.65	.80	.95	1.20	1.60	2.00	2.35	2.60	2.85	3.10	3.35	3.60	1.90	.40
Havre	.20	.35	.45	.60	.75	.90	1.20	1.50	1.75	1.95	2.15	2.30	2.40	2.50	1.50	.30
Paris, Rouen	.45	.55	.70	.90	1.15	1.35	1.85	2.25	2.50	2.75	3.00	3.25	3.50	3.75	1.95	.40
All other places in France	.60	.90	1.10	1.25	1.50	1.75	2.25	2.75	3.25	3.75	4.25	4.50	4.75	5.00	2.50	.40
Antwerp, Amsterdam and Rotterdam	.35	.40	.50	.60	.80	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	1.75	.40
All other places in Belgium, Holland and Switzerland	.55	.70	.90	1.15	1.40	1.70	2.10	2.50	2.90	3.30	3.70	4.00	4.25	4.50	2.50	.40
Vienna, Prague	.50	.65	.90	1.15	1.40	1.65	2.00	2.30	2.60	2.90	3.15	3.40	3.60	3.75	2.00	.40
All other places in Austria-Hungary	.60	.75	1.00	1.25	1.65	2.00	2.50	2.85	3.20	3.50	3.75	4.00	4.25	4.50	2.50	.40
Copenhagen, Christiania, Christiansand	.50	.60	.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	1.80	.50
All other places in Denmark, Norway and Sweden	.70	.90	1.15	1.45	1.70	2.00	2.50	3.00	3.50	3.75	4.00	4.25	4.50	4.75	2.80	.45
Genoa	.50	.60	.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	1.50	.45
All other places in Italy	.80	.90	1.00	1.60	2.20	2.75	3.25	3.75	4.25	4.50	4.75	5.00	5.25	5.50	2.75	.50
All places in Russia, Spain, Portugal and Malta	.80	1.15	1.35	1.65	2.00	2.25	2.75	3.25	3.75	4.25	4.75	5.25	5.75	6.00	3.00	.75
Roumania, Bulgaria, Servia, Greece, Turkey	1.50	1.75	2.25	2.75	3.40	3.75	4.25	4.75	5.25	5.75	6.15	6.40	6.60	6.75	3.30	.65
AFRICA—Egypt, Alexandria	.60	.75	1.00	1.25	1.50	1.75	2.00	2.25	3.00	3.50	4.00	4.50	4.75	5.00	3.50	.60
All other places in Egypt	.75	1.00	1.25	1.75	2.00	2.50	2.75	3.00	3.50	4.00	4.50	5.00	5.50	6.00	3.50	.75
Morocco, Algeria, Tunis and Tripoli	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.25	6.50	.500	.75
Capetown, Port Elizabeth and Port Natal	.55	.60	.80	1.00	1.25	1.50	1.75	2.00	2.50	2.75	3.00	3.50	4.00	4.50	4.00	1.00
All other places in British Guinea, Africa, Transvaal and Orange Free State	1.25	1.50	2.00	2.25	2.50	2.75	4.00	4.75	5.25	5.75	6.25	6.75	7.25	8.00	6.00	1.00
ASIA—Bombay, Calcutta, Madras and Colombo	.55	.60	1.00	1.25	1.75	2.25	3.00	3.75	4.25	4.50	4.75	4.90	5.00	5.25	4.05	1.00
All other places in India and Ceylon	.75	1.00	1.50	2.00	3.00	4.00	5.00	6.00	6.50	7.00	7.50	8.00	8.50	9.00	5.75	1.50
Hong Kong, Shanghai, Penang, Singapore and Yokohama	.50	.60	1.00	1.50	2.00	2.25	2.75	3.25	3.50	3.75	4.50	4.75	5.00	5.25	3.30	1.25
All other places in China and Japan	.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	4.40	1.50
Manila	1.00	1.00	1.00	1.50	2.00	2.00	2.25	2.75	3.25	3.75	4.25	5.50	6.00	6.25	4.20	1.50
AUSTRALASIA—Melbourne, Sydney and Adelaide	.50	.50	.50	.75	1.00	1.25	2.00	2.25	2.50	2.75	3.00	3.20	3.35	3.50	2.15	1.00
Wellington, Auckland, Lyttelton and Dunedin	.60	.60	.95	1.25	1.50	1.75	2.25	2.75	3.25	3.75	4.25	4.50	4.75	5.00	3.25	1.00
All other places in Australia and New Zealand	.75	1.00	1.25	2.00	3.00	3.50	4.50	5.50	6.00	6.00	6.00	6.50	6.50	6.50	3.60	1.50
WEST INDIES—Cuba, Havana, Matanzas, Cienfuegos and Santiago	.40	.45	.60	.70	.80	1.00	1.40	1.70	2.00	2.25	2.50	2.75	3.00	3.50	2.30	.50
All other places in Cuba	.90	1.00	1.30	1.60	1.75	1.95	2.40	2.80	3.20	3.60	4.00	4.50	5.00	5.50	3.50	.75
PORTO RICO—Ponce, San Juan, Mayaguez	.45	.50	.65	.75	.90	1.10	1.45	1.75	2.10	2.40	2.75	3.00	3.25	3.50	1.50	.75
All other places in Porto Rico	.90	1.00	1.30	1.60	1.75	1.95	2.40	2.80	3.20	3.60	4.00	4.50	5.00	5.50	3.50	.75
Bermuda	.30	.40	.50	.75	1.00	1.25	1.30	1.50	1.75	2.00	2.20	2.40	2.60	3.00	2.10	.50
Jamaica, Hayti, Trinidad, Turk's Island, Martinique, Grenada, St. Thomas, St. Croix, St. Kitts and Bahama Islands	.50	.75	1.00	1.25	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	2.10	.50
Main Ports in CENTRAL AMERICA—Costa Rica, Guatemala, Honduras, Nicaragua and San Salvador	1.25	1.35	1.50	1.75	2.00	2.25	2.50	3.00	3.25	3.50	3.75	4.00	4.25	4.50	3.20	.75
GUIANA—British, Dutch and French	1.25	1.35	1.50	1.75	2.25	2.35	2.50	2.65	2.75	3.00	3.25	3.50	3.75	4.00	2.20	1.00
SOUTH AMERICA—United States of Colombia	1.25	1.35	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.25	6.50	4.25	1.00
Brazil—Bahia, Para, Pernambuco, Santos, Rio de Janeiro	1.50	1.75	2.25	2.50	2.75	3.25	4.00	5.00	6.00	6.50	6.50	6.75	6.75	7.00	4.25	1.00
Chili, Peru and Ecuador	2.00	2.50	3.00	3.50	4.00	4.25	4.50	4.75	5.00	6.00	6.25	6.50	6.75	7.00	4.25	1.00
Buenos Aires and Montevideo	.75	1.00	1.25	1.50	2.00	2.25	2.75	3.25	3.75	4.25	4.50	4.75	5.00	5.50	3.20	1.00

The above rates are figured at 25 pounds for every cubic foot measurement; if measurement exceeds one cubic foot to every 25 pounds the rate will be higher in the same proportion.

To countries named below consular invoices are required, which must be written in language of country goods are destined to, and on certain prescribed forms. Failure to comply with this rule will subject goods to seizure. Dominica, Costa Rica, Guatemala, Honduras, Nicaragua, San Salvador, Brazil, Argentina, Ecuador, Peru, Paraguay, United States of Colombia, Uruguay, Venezuela, Chili.

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(Furnished by Export Shipping Co.)

FOR GENERAL CARGO.

Liverpool 15/—	London 15/—	Glasgow 15/—	Bristol 15/—	Leith 17/6	Hull 17/6	Antwerp 15/—	Bremen 12c. cu. ft.	Hamburg 12c. cu. ft.	Rotterdam 12c. cu. ft.	Marseilles 17/6
Copenhagen 17/6	Havre 15c. cu. ft.	Trieste 17/6	Naples 17/6	Genoa 17/6	Barcelona 25/—	Alexandria 27/6	Constantinople 27/6	Bombay, Calcutta 30/	Singapore, Shanghai, Manila, Yokohama 35/	Melbourne, Sydney 35/
New Zealand Ports 35/—	Cape Town 35/—	Havana 15c. cu. ft.	San Juan 15c. cu. ft.	Buenos Aires, Montevideo 13c. cu. ft.	Rio de Janeiro 24c. cu. ft.	Callao 31c. cu. ft.	Valparaiso 26c. cu. ft.			

To all rates quoted in sterling add 5 per cent. primage. Rates per ton are for 2,240 lbs., or 40 cubic feet, at ship's option.

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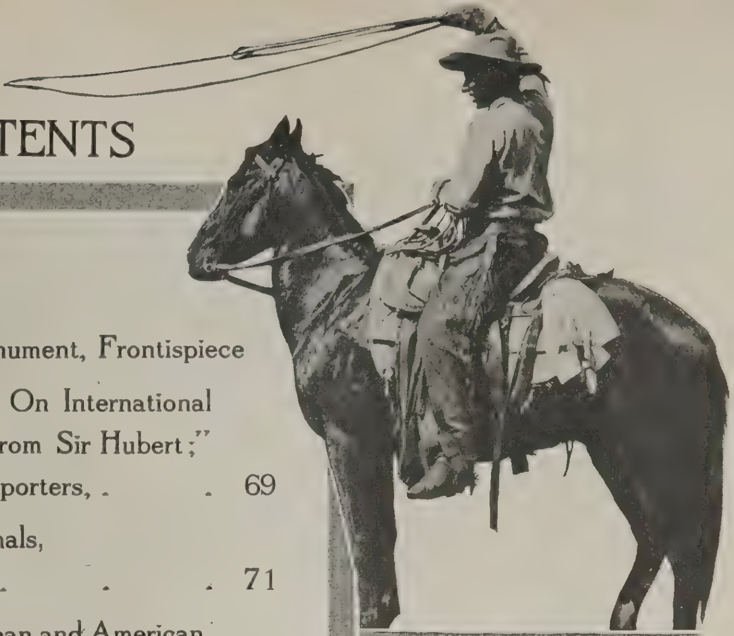
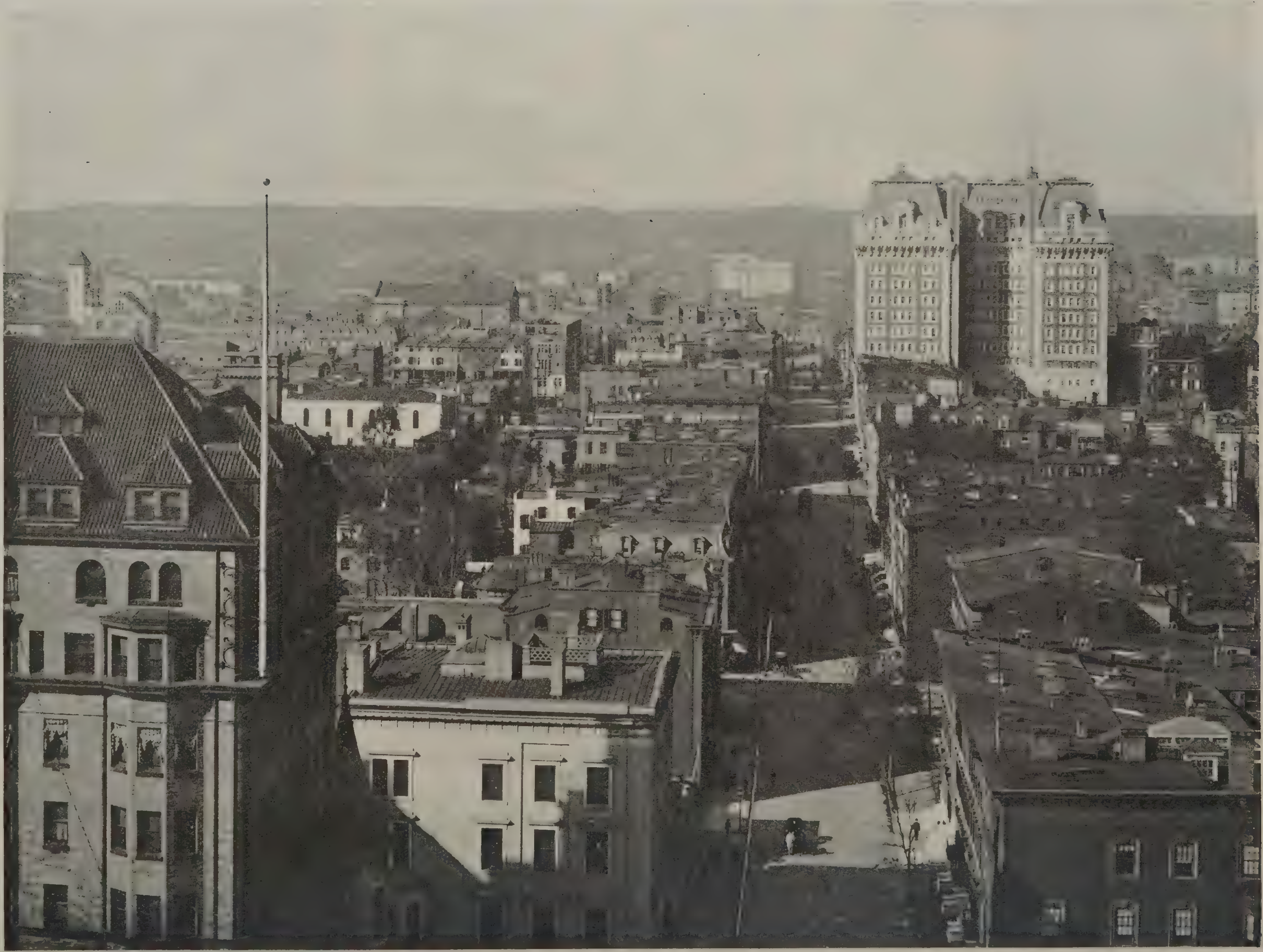


DECEMBER, 1907

Subscription rate to any part of the world $2.00 a year, American Gold, or its equivalent in any other currency. Single copies 20 cents.

During the twelve months ending with December, 1907, 211,450 copies of the AMERICAN EXPORTER were printed and circulated—an average of 17,621 per month.

Beef "on the Hoof"
SEE PAGE 71

Copyright by Detroit Photographic Company.

BALTIMORE AS SEEN FROM THE MONUMENT.

(SEE PAGE 78.)

AMERICAN EXPORTER
EDITORIAL

The AMERICAN EXPORTER is both an independent and impartial trade journal. Its publishers have no connection with any manufacturing concern, export house or other business except publishing and, hence, have no outside interest to serve. The editorial management is separate and distinct from its business department.

INTERNATIONAL MONEY.

HON. GEORGE B. CORTELYOU.

The recent international demand for gold coin has brought the great national banking institutions of England, France and Germany, and our own United States Treasury, over which Hon. George B. Cortelyou presides, to public attention. Such a vast amount of business is carried on with an exchange of credits that it is hard for the layman to understand or follow financial conditions, especially as regards their international complications.

It is of course a well-known fact that in international trade dealings mutual debts are, so far as possible, cancelled, and gold and silver are sent only when it is absolutely necessary.

As civilization advances international trade and international communication increase. The former has been greatly facilitated and increased during the last century by means of rapid communication through railways, steamships, telegraphs, etc. Improved business methods, for instance the establishment of clearing houses, have also greatly assisted international trade in a financial way.

It is, however, often necessary to send the precious metals, especially gold, to countries in whose favor there is a balance of trade. This is done in two ways, either by sending gold bullion or by forwarding gold coins. In the latter case much trouble and expense is caused through a want of uniformity in fineness of the coins of the different countries. The coins stamped by the British Mint, for instance, are 22 carats fine; that is, they contain eleven parts of pure gold and one part of copper; whereas the gold coins of most of the other European countries contain nine parts of gold and one part of the baser metal. Hence the coins have to be melted and purified, or mixed with copper, as the case may be, and coined again. All this could be avoided in two ways: (1) by means of an international agreement a uniform fineness for gold coins could be agreed upon, or (2) an international gold coin could be made which might be used in international transactions. The latter proposal, though more difficult to carry out, would do away with the necessity of melting imported foreign coins. Such a coin would necessarily be made of gold, because the standard of value of most of the civilized countries of the world is gold, and even in countries like India and China, where silver is the chiefly used metal, it is probably gold which ultimately determines the general prices.

ON INTERNATIONAL CO-OPERATION.

In the letters of John Ruskin, philosopher, critic and idealist, is to be found a striking passage on international commercial relations. Writing in 1867, Ruskin looks forward as follows to an era of commercial co-operation in place of commercial rivalry, enlarging the idea to include competitive nations as well as competitive firms:

"I especially want you, for one thing, to understand the sense in which the word 'co-operation' is used in my books. I don't at all mean the co-operation of partnership (as opposed to the system of wages) which is now so gradually extending itself among our great firms. When I use the word 'co-operation' it is not meant to refer to these new constitutions of firms at all. I use the word in a far wider sense, as opposed, not to masterhood, but to *competition.* I do not mean, for instance, by co-operation that all the master bakers in a town are to give a share of their profits to the men who go out with the bread; but that masters are not to try to undersell each other, nor seek each other's business, but are all to form one society, selling to the public under a common law of severe penalty for unjust dealing, and at an established price. * * * For final instance, I mean by 'co-operation' not only fellowship between trading *firms,* but between trading *nations;* so that it shall no more be thought (as it is now, with ludicrous and vain selfishness) an advantage for one nation to undersell another, and take its occupation away from it, but that the primal and eternal law of vital commerce shall be of all men understood, namely, that every nation is fitted by its character, and the nature of its territories, for some particular employments or manufactures; and that it is the true interest of every other nation to encourage it in such specialty, and by no means to interfere with, but in all ways forward and protect its efforts, ceasing all rivalship with it, so soon as it is strong enough to occupy its proper place."

It is to be noted that in these past forty years there has been a very decided trend towards the elimination of ruinous competition between firms engaged in the same line of activity. Associations formed for the mutual protection and regulation of all members, securing pledges to abstain from throat-cutting tactics, are common, as are also "gentlemen's agreements" between competing companies. The friendly rivalry of the true sportsman has been substituted for the deadly enmity of warring foes. The result has been of immense advantage to the commercial world, for it has brought about particularly the specialization of men and corporations, placing the right work in the right hands, and manufacturers have had less temptation to cheapen the quality of their products.

Ruskin's conception of international co-operation is somewhat ahead of the times, but it cannot be treated as the dream of an idealist, for the specialization of the commercial world and the growing amity between nations are certain to bring this ideal to some realization.

"PRAISE FROM SIR HUBERT."

"Wayward Critic," whose frank remarks on trade appear in the *English Hardwareman,* pays this sincere tribute to his American cousins in the issue of October 19:

"Nothing in the world is more interesting to most of us than human nature. The personal element is always appealing to us. I frequently scan the pages of various American journals, which for the most part are distinctly worthy of perusal. Some time ago I was much interested in the report of the proceedings at a banquet to Mr. Geo. P. Rowell, a leading New York advertising agent. I remember that the speeches were literary gems. But what I do most certainly remember is that the grand theme throughout the speeches was the irreproachable honor of the guest of the evening. Now there is a danger in this country of thinking that America is wholly made up of men who hustle to get rich, regardless of all circumstances and consequences. One of my greatest passions is my love for my own country and its people, but the grandeur of character in some of our cousins across the water is something to touch the heart."

TARIFF COMMISSION.

Evidently the trip made by Mr. Jas. B. Reynolds, Assistant Secretary of the United States Treasury, and a special commission, to investigate various features of the tariff relations between this and foreign countries, has been crowned with success and attended by nothing but pleasant incidents.

"We went abroad to look, listen and to learn, not to revise the tariff or reform the world," said Mr. Reynolds on his return. "It was the most practical of errands. It was to look into customs conditions and customs relations with the United States of four countries, viz.: France, Austria, Germany and England.

"We were met in the fairest and friendliest spirit. Every door that led to desired information was thrown open to us. and every government facility placed at our disposal. We return with the information we sought; not gathered in academic form and fashion, but obtained at first hand by personal contact with the foreign government officials and with representative business men and commercial bodies.

"Outside of the broad and general customs question, we looked into some special matters, the most important of which was, perhaps, the much-discussed question of Limoges ware and its market value in France. We are very hopeful that the arrangements and plans made as the result of this investigation will be effective in bringing about a settlement of this matter, which has been a disturbing factor for so long a time, and that by the first of the year it will be taken entirely out of the field of controversy."

TO IMPORTERS.

Importers desiring to open connection with American manufacturers would in many instances greatly facilitate negotiations if at the start they gave their American correspondents a clear idea of their position, capital and responsibility.

In asking for prices and terms, for instance, it is best to state whether commission house, jobber, retailer or consumer. It is well to realize that a firm well known in its own country for stability and integrity may not be known to an American manufacturer, and no harm can be done, while much good may be accomplished, by referring the manufacturer to firms in New York or other parts of the country, with whom they have done business, or to refer to some leading European bank or firm.

The American Exporter is called upon constantly by its advertisers for information regarding the financial standing of foreign houses, and maintains a special department for handling this information. All importers engaged in, or contemplating, purchasing from American manufacturers are cordially invited to send us references, New York or foreign, in order that we may investigate them and promptly answer our inquiries.

PEACE MEETING.

The Central American Peace Conference was formally opened at Washington on Friday, November 15. A day or so previously it was announced that Secretary of State Root would call the first meeting to order and deliver an address of welcome to the visiting delegates, after which the delegates would proceed to perfect a permanent organization.

EXPORT OF MEAT AND MEAT ANIMALS

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An Historical Sketch of the Industry and Discussion of Present Tendencies.

BY GEORGE K. HOLMES,

Chief of Division of Foreign Markets of the United States Department of Agriculture.

THE exporting of meat and of various edible products of slaughtered animals from this country grew to notable proportions about 1875 to 1880, but some of these commodities were of considerable account in the exports of half a century ago. Exports antedating 1890 may be regarded as now belonging to an historical period.

Exported live cattle first passed the 100,000 mark in number in 1879 and the 200,000 mark in 1889. The exported live sheep were first above the 100,000 mark in 1874 and above 200,000 in 1879, and the largest number ever exported in one year was 337,251 in 1883. The exports of live swine were much less in number than those of live cattle and sheep, and in only one year, 1874, did the number go above 100,000.

The first prominent exports of meat and its products were cured meats and fats. Many millions of pounds of salted or pickled beef were exported annually before 1861, and the trade has been a steady and large one since the middle of the last century.

This class of beef has usually been exceeded in exports by the exports of salted or pickled pork, which rose in quantity to between fifty and one hundred million pounds annually from 1872 to 1889.

Bacon is the class of meat having the largest exports during the period under consideration. By 1854 the exports amounted to 46,000,000 pounds; the quantity was over 200,000,000 pounds in 1863, nearly 400,000,000 pounds in 1873, nearly 600,000,000 pounds in 1878, and 760,000,000 pounds in 1880, the largest amount ever exported in one year.

The first separate account of exports of hams was published in 1881, when the exports amounted to 74,000,000 pounds. The first published exports of quantity of canned meat were of canned beef in 1887, when the trade had grown to 43,000,000 pounds.

With the invention of the transportation of fresh meat in cold storage the exports of fresh meats soon assumed large proportions. The first account of the quantity of these exports was published for 1877, when 49,000,000 pounds of fresh beef were exported and 349,000 pounds of fresh mutton. The fresh beef exports more than doubled the above figure before 1890, and the exports of fresh mutton went as high as 3,380,000 pounds in 1881, but subsequently much declined. Fresh pork first appears in published quantity exported in 1884, with 185,000 pounds, but the quantity fell to 23,000 pounds in 1889.

Animal fats were exported in large quantities half a century ago. In 1851, 20,000,000 pounds of lard were exported. The quantity exceeded 100,000,000 pounds by 1862, 200,000,000 by 1873, and reached 378,000,000 by 1881, after which there was a decline to 1889. Tallow had an export of 8,000,000 pounds in 1851, and after numerous fluctuations rose to 102,000,000 pounds in 1874 and 111,000,000 pounds in 1880, quantities that are among the highest ever reached.

Oleo oil became a prominent export in 1878, when the quantity was first published as 1,698,000 pounds. The next year the exports were 13,000,000 pounds, and they went as high as 460,000,000 pounds in one year before 1890.

Oleomargarine rapidly grew in its exports after the establishment of its manufacture, the published quantity of exports first appearing in 1882, when 2,157,000 pounds were exported, which was slightly under the largest export for one year previous to 1890.

Recent Period, 1890 to 1906.

Exports of live meat animals and meat and its products met with much rough weather in the last decade of the nineteenth century and in the years subsequent. The competition of cheaper and more abundant American meats and meat products has been met by restrictive policies in importing countries in Europe; but, in spite of such policies and with a continued reception of live meat animals and meat products by the United Kingdom without obstructive restrictions, the business of exporting these commodities increased mightily during the seventeen years following 1889.

The value of the exports of meat animals and packing-house products (including non-edible products) increased from $161,000,000 in 1890 to $252,000,000 in 1906; the live meat animals from $32,000,000 in 1890 to $44,000,000 in 1906, and the packing-house products from $129,000,000 in 1890 to $208,000,000 in 1906.

The number of exported cattle rose to nearly 600,000 annually from 1904 to 1906; the number of exported sheep reached its highest figure in 1896 with 492,000, after which the annual number has fluctuated much, but, on the whole, has declined. Swine exports have become both irregular and small, going as high as 96,000 in 1891 and as low as 1,553 in 1894.

Exports of fresh meats increased in quantity after 1889, but declined in the last few years; in 1890 173,000,000 pounds of fresh beef were exported, the quantity was as high as 351,000,000 in 1901, and was 268,000,000 pounds in 1906.

At times of scarcity in the supply of fresh mutton from Australasia the exports from this country have risen to a comparatively high figure, the highest quantity being 6,000,000 pounds in 1903; but aside from such special demand the exports from this country in recent years have been about half a million pounds annually.

Fresh pork exports grew rapidly in quantity from 279,000 pounds in 1890 to 44,000,000 pounds in 1902, but the quantity fell to 13,000,000 pounds in 1906.

Canned beef was in great demand abroad during the seventeen years under review; the exports in 1890 were 83,000,000 pounds, and in the following year 110,000,000 pounds, the highest figure ever touched. The smallest quantity for one year of the seventeen years was 37,000,000 pounds in 1898.

Canned pork first appears in published exports for 1900, when the quantity was 8,500,000 pounds; the highest exported quantity for one year was 13,600,000 pounds in 1903, and the quantity for 1906 was 12,700,000 pounds.

In addition to canned beef and canned pork other canned meats are exported, the value, but not the quantity, being reported. This miscellaneous class of canned meats was first stated in a published report for 1900, when the value was $1,700,000; the highest value for one year was $2,300,000 for 1904, and the value for 1906 was $1,600,000.

The cured meats have continued to hold prominent places in the recent years under review. Salted or pickled beef diminished in exports from 98,000,000 pounds in 1890 to 44,000,000 pounds in 1898, after which there was some recovery, and in 1906 a sudden increase to 81,000,000 pounds. During the seventeen years other sorts of cured beef were exported in annual quantities ranging from about 100,000 pounds to over 2,000,000 pounds.

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LOADING CATTLE ON CARS.

Salted or pickled pork, notwithstanding considerable annual fluctuations, has increased in exports during the seventeen years, the quantity in 1890 being 80,000,000 pounds, and in 1906 142,000,000 pounds, the smallest quantity between being 52,000,000 pounds in 1893.

During seven of the seventeen years more than half a billion pounds of bacon were exported yearly, the largest quantity being 650,000,000 pounds in 1898, but from that number the quantity declined to 207,000,000 pounds in 1903, after which there was a partial recovery to 361,000,000 pounds in 1906.

Exports of hams rose from 77,000,000 pounds in 1890 to 200,000,000 pounds in 1898, after which year the annual exports have fluctuated around that number, the highest exported quantity being 228,000,000 pounds in 1902.

Sausage exports became large enough to receive separate attention in published statements by 1901, when the exports reached 9,800,000 pounds; subsequently the exports of this commodity have ranged between 5,000,000 and 8,000,000 pounds.

Sausage casings have gained much in foreign demand since 1889, and the value of their exports rose from $700,000 in 1890 to $2,600,000 in 1906.

No meat or meat product has equaled lard in the quantity of its export. This commodity has occupied a place of increasing importance, and during the seventeen years under review its exports grew from 471,000,000 pounds in 1890 to 742,000,000 pounds in 1906.

Lard compounds, likewise, although exported in quantities that are small compared with those of lard, gained suddenly in importance, and in 1897 jumped from previous annual exports of one to two millions pounds to 18,000,000 pounds. The quantity grew to 68,000,000 pounds in 1906.

Another meat product meeting a persistent demand abroad is oleo oil, the exports of which have increased about 200 per cent. during the seventeen years under review, or from 68,000,000 pounds in 1890 to 210,000,000 pounds in 1906. For the same reason, oleomargarine has increased much in favor as an export and in 1906 reached its highest figure, 12,000,000 pounds.

Tallow exports have fluctuated much during the seventeen years, going as low as 26,000,000 pounds in 1895 and as high as 113,000,000 in 1890. The period closed with 98,000,000 pounds of exports in 1906.

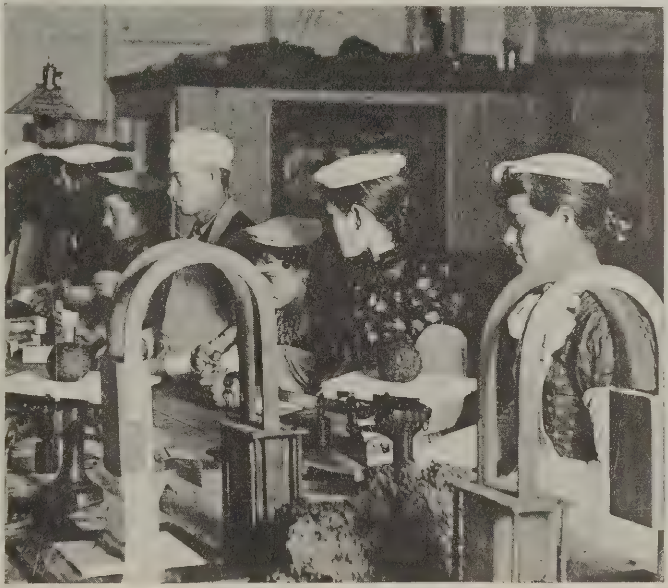
Although some packing-house products are not foods, their production is closely related to the business of slaughtering and packing. These articles are such commodities as bones, soap stock, hair, bristles, hides and skins, etc.; but in the case of some of these items imports are of greater account than the exports.

The exports of 1907 made perceptible advances over the averages of 1903-1906, in the items of cured beef other than salted or pickled, fresh beef, lard, lard compounds, oleo oil, cured pork hams, salted or pickled pork, sausage and sausage meats, and tallow, so that in spite of declines in exports of canned beef, cured bacon, mutton, oleomargarine, canned pork and fresh pork, the exported meat and meat products exceeded the average of 1903-1906 by 134,000,000 pounds and reached a total of 2,047,000,000 pounds. Yet this was 162,000,000 pounds under the average of 1898-1902.

The approximate average number of live meat animals exported annually during the years 1899-1901, after the subtraction of imports, was 240,000 cattle, not including calves, and 36,000 hogs, the sheep not being worth mentioning.

The exported meat has been reduced to terms of live animals in accordance with averages and fractions subsequently to be explained, and upon adding the computed animals to the live animals the total exports of live meat animals and of meat and meat products expressed in terms of live animals as for 1900 follow: Calves, practically none; cattle, except calves, 1,321,000; lambs, practically none; sheep, except lambs, 110,000; swine, 8,659,000; total meat animals exported, live and computed, 9,991,000. Upon converting the foregoing numbers into percentages of the total number of animals available for slaughter in 1900, or the supply, it appears that the exported cattle, except calves, were 10.18 per cent. of the supply; that the sheep, except lambs, were 0.09 of 1 per cent. of the supply; that the swine were 17.27 per cent. of the supply, and that, all animals being merged into one total, the exported number was 10.69 per cent. of the supply.

The cattle, except calves, exported on the hoof in 1900 were 1.85 per cent. of the number of cattle, except calves, in the meat supply of that year; the similar percentage for swine is 0.07 of 1 per cent., and for all meat animals constituting the supply 0.3 of 1 per cent.



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CANNING MEATS.

In order that annual fluctuations in exports may be excluded from attention and the general tendency may be discovered, a process of averaging exports in five-year periods, beginning with 1878-1882, has been adopted.

As a result of averaging, it appears that from 1878-1882 to 1903-1906 cattle exports increased in a considerable degree, or from 139,000 in number to 537,000. Swine exports decreased from 60,000 to 29,000, and sheep exports were about 225,000, except that the average number was 186,000 annually during 1878-1882 and 90,000 during 1888-1892.

Fluctuations cannot obscure the fact that bacon has been losing its old-time position in exports, but hams have distinctly gained. On the whole, canned beef may be regarded as gaining in exports from 1887 to 1903-

1906. Lard gained steadily in prominence from 1883-1887 to 1898-1902, but lost 50,000,000 pounds of its exports in each of the succeeding four years on the average. A distinct gain appears in the case of oleomargarine exports.

Stock of Meat Animals.

The number of meat animals in the world cannot be determined with satisfaction, but an approximation can be attained which will indicate the relative standing of certain countries in the possession of the principal meat animals. A search long and thorough has been made in the Bureau of Statistics of this Department, wherein were ascertained the latest and most approved figures representing the number of cattle, goats, sheep and swine in the world as far as known. The only kinds of animals included are those from which meat is derived in the United States.

It is to be understood that the grand totals are minimum numbers, since many minor countries are omitted and also a few countries in which there is a large number of meat animals.

With this understanding it appears that contiguous United States has 74,200,000 cattle of the 424,500,000 cattle known to be in the world, or 17.5 per cent. British India has a larger fraction, or 20.9 per cent., but the fraction is smaller than that of the United States in every other country—one-half or less.

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PREPARING CANNED SOUPS.

This country does not figure so largely in comparison with the total sheep, since the number in contiguous United States is but 53,500,000 of the 609,800,000 sheep, or 8.8 per cent. This fraction is exceeded by that of three countries. Argentina has 19.7 per cent. of the world's sheep as far as known; Australia has 12.2 per cent., and European Russia 9.7 per cent.

The greatest prominence of this country in the possession of a meat animal is found in the number of swine. Of the world's 141,300,000 known swine the United States has 56,600,000, or 40.1 per cent.; Germany is the second country in order of importance, with 13.4 per cent.; Austria-Hungary follows with 9 per cent., and European Russia with 8.4 per cent. Thus it will be seen that America's lead in this line is very great and will continue so.

REDUCING COST OF REINFORCED CONCRETE CONSTRUCTION.

The various improvements which are taking place from time to time in all branches and departments of the concrete industry, the infusion of new ideas, and the more effective execution of old ones, are bringing both initial and ultimate cost lower and lower each year. Conditions which at present obtain warrant placing the estimate for a concrete structure at a figure nearly identical with that of heavy timber mill construction.

Within the last ten years improvement in the method of manufacturing and handling of cement has reduced the price of this essential some 50 per cent. For analogous reasons, namely, recent improvements in crushing machinery, the hardest of stone can be broken and crushed at an expenditure much less than the process of a few years ago necessitated.

THE PRODUCTION OF LIME IN 1906.

The lime produced in the United States in 1906 amounted to 3,197,754 short tons, valued at $12,480,653, an increase over the production for 1905 (which amounted to 2,984,100 tons, valued at $10,941,680) of 213,654 tons in quantity and of $1,130,425 in value. The average price per ton in 1906 was $3.90, against $3.67 in 1905, an increase of $0.23.

WESTERN PACIFIC RAILWAY.

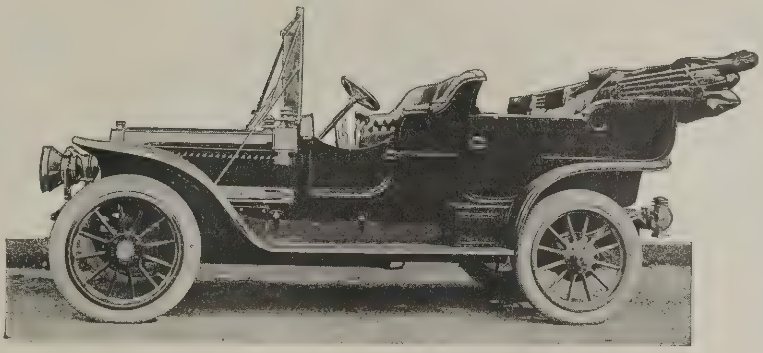
Some late figures on the progress of work on the Western Pacific show track laid as follows: From Salt Lake west, 154 miles; from Stockton toward Oakland, 27 miles; from Stockton north to the Mokelumne River, 26 miles, and from Marysville northeast to Oroville, 26 miles, a total of 234 miles laid. To join Oakland and Stockton needs 52 miles of track; Stockton and Marysville, 62 miles, and to join the western work with the work at this end of the line, 695 miles.

Mail advices from Tokio state that a destroyer, intended to be the best of her class, will be built at Maizuru Naval Yard for the Japanese Navy.

MOTOR CAR DEVELOPMENT, EUROPEAN AND AMERICAN.

How This Country Has Steadily Forged Ahead in This Industry Until Today She Outstrips All Rivals in Quantity and Quality.

BY ERNEST COLER.



A SUCCESSFUL AMERICAN SIX-CYLINDER CAR.

THE development of the automobile industry, both in this country and abroad, has been so rapid and far-reaching that the phrase, "The automobile has come to stay," has entirely lost its former significance, and seems as much out of place as the observation that the railroads were likely to become a permanent institution. From a costly plaything, the toy of the rich, as it has been called, the automobile has grown into a new mode of transportation, serving the ends not only of pleasure but also those of commerce, with an efficiency never even approximated by the horse, and with a flexibility surpassing the railroad. In fact, the automobile is destined to perform on the highways of the country the same service to the individual that has been rendered by the steam locomotive to the country at large.

Though originally designed as a pleasure vehicle, the astute automobile designer has been quick to perceive the enormous possibilities of the automobile in the field of commerce. Even the farmer has with eagerness utilized the motor, not only for purposes of travel but also for those of performing the thousand and one services formerly done by the horse and by the power of the windmill.

In considering the development of the automobile it is not necessary to dwell upon the early attempts at the construction of self-propelled vehicles, since they, though of importance in directing the inventor's mind, bear but a subordinate relation to the motor car of the present day.

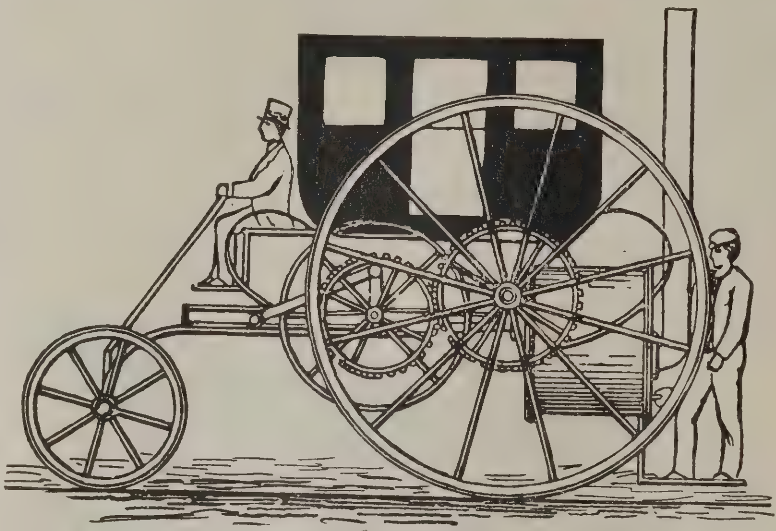
The expansive force of steam produced in the old-fashioned manner was the only means of propulsion for motor cars until 1878, when the Frenchman Serpollet constructed the first so-called "flash boiler," which generated steam from very small quantities of water passed through superheated tubes. This design made possible a great reduction in the dimensions of the boiler, and the invention did much to stimulate engineers to exert themselves in the improvement of the self-propelled vehicle. At about the same time numerous attempts were made to produce reciprocating motion by exploding within a cylinder gunpowder and other explosives. In 1861-62 Beau de Rochas, a French engineer, invented the first successful internal-combustion or explosive engine. But to become the father of the modern automobile was left to the German Gottlieb Daimler, the inventor of the high-speed automobile motor. At about the same time, and quite independently from Daimler's efforts, Carl Benz, another German, arrived at the same solution of the problem. The sale of the Daimler patent to the French firm, Panhard & Levassor, marked the inception of the French automobile industry, and the priority of Daimler's invention explains the leadership assumed by France and held by it until recently.

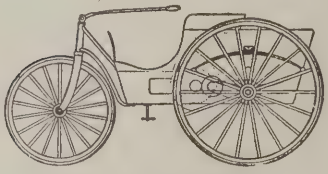
For some time but little attention was given to the new development on this side of the Atlantic, mainly because engineering minds were occupied with other problems that did not present themselves to the European engineer, and also because the matter was looked upon as a fad that would not last.

In the United States, too, the initial attempts had been with steam engines. Only a short time after the Daimler invention, R. E. Olds, of Lansing, Michigan, completed his first "horseless carriage," an invention which promptly earned for him the name of a "crazy inventor," and made him the subject of the derision of his fellow citizens. Olds was a manufacturer of stationary gas engines, and though his first production was a rather crude affair, as will be seen from the accompanying illustration, he was firmly convinced of the advantages of the gas engine for use in automobiles, and continued his work along the same lines, with ultimately splendid success.

The first really successful automobile was made by Olds in 1892, and sold to a patent medicine concern in the East Indies, where it did excellent service for a number of years.

At about the same time the Duryea brothers, Charles E. and J. F.; Elwood Haynes, Winton, Whitney and others were putting their best efforts to the task of constructing the American automobile. On Thanksgiving Day of 1895 the Chicago *Record-Herald* arranged the first automobile race held in America, with a view to stimulating interest in the automobile as a means of transportation. It is somewhat amusing when we read the press accounts of this first race and note the comments of the *Horseless Age,* one of the earliest automobile trade papers, in which was deplored the recklessness of the participants in the race, who had the temerity to run their cars at the phenomenal speed rate of from twenty-eight to thirty miles an hour. From this time on the development of the American automobile industry proceeded in leaps and bounds. Although France still retained its superiority, Germany and Belgium were close seconds, while in England no progress was made until 1896, when the ancient locomotive act was abrogated. In the year 1899 the number of automobiles in the United States was fifty. That was only eight years ago. And to-day? To-day America is the greatest of automobile-producing countries. The investment of capital during the past season has been greater than ever before, and one of the encouraging features of these investments is that they have not come from new capital seeking high returns from a comparatively small outlay, but represent a healthful expansion of what may be termed the backbone of the American automobile industry. Fully 90 per cent. of the increases in manufacturing facilities have been provided by already successful manufacturers, and the result will be an increased output of many thousand cars.

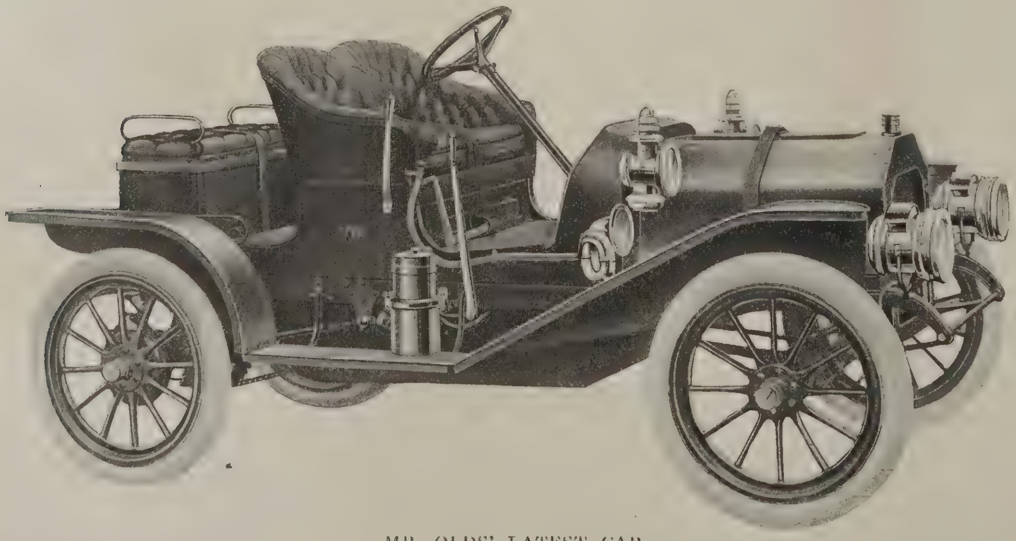

AN EARLY EUROPEAN ATTEMPT.


MR. OLDS' FIRST CAR.

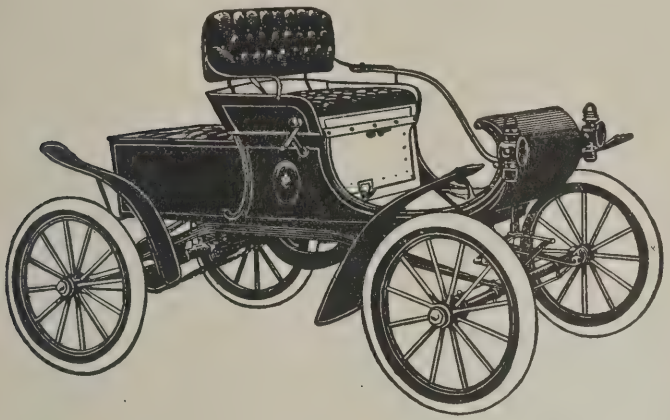
Will there be an outlet for so many automobiles? Can the yearly production be increased to so great an extent without creating the congestion that every conservative manufacturer is most solicitous to avoid?

The answer is most emphatically in the affirmative. The American automobile industry is only in its infancy, though there is no doubt that it is the healthiest infant industry the world has ever seen.

In 1898 the total number of cars produced in all countries was between three and four thousand. In 1902 America turned out 314 automobiles. In France, the first 1,000 automobiles were built in 1898; in Germany and in England in 1899; in Belgium in 1902, and in Italy and America in 1903, five years after France. While France produced 10,000 automobiles in 1902, America manufactured the same number three years later, cutting down the lead of France by two years. In 1905 France made 30,000 cars, and only one year later, in 1906, America produced the same number. The output of the American factories in 1902 equaled that of England, Belgium and Italy combined. During the 1907 selling season more than 40,000 motor cars were built in the United States and sold at home and abroad, and in reaching this high-water mark the American industry has assumed the lead over all automobile building countries as far as volume of production is concerned.


MR. OLDS' LATEST CAR.

At the inception of the industry in America this country lacked the technical men whose knowledge and skill were indispensable to success. Yet even at this stage the methods compared favorably with foreign practice, while the dispatch of the work itself was typically American, surpassing by far that of the foreign competitor. It is interesting to note, for instance, that while in the eleven months ending May, 1905, the exportation of American automobiles and parts amounted only to $2,167,744, it reached $2,957,748 for the corresponding period in 1906, and $4,770,187 for the eleven months ending May, 1907. The gain expressed in per cent. amounts to 61 per cent. in one year, and to 120 per cent. in two years, so that the yearly increase appears to be uniformly about 60 per cent. The total American exportations for May, 1907, alone amounted to 281 cars, representing a value of $665,450, or a net gain over the corresponding month in 1906 of $180,909.


AN EARLY TYPE OF AMERICAN RUNABOUT.

It is natural that the increase in American home consumption and in exports should be accompanied by a decrease in the exportation of America's most formidable rival—France. It is a fact well recognized in the industry abroad that the French automobile industry has reached a stage where it has become difficult for the manufacturer to find outlets for his goods. The advent of this condition in France had been predicted in this country some two years ago by men who had been closely allied with other branches of the mechanical industry, notably the bicycle trade, in which experience has established a similar trend of affairs. To-day we find the foreign manufacturer in a position where he has to make preparations to defend his own market from threatening American invasion. With every desire to pay deserved tribute to the foreign automobile designer, it cannot be denied that American ingenuity has mastered the automobile problem with much greater alacrity, and we find, in consequence, in the American automobile a production possessing more than one allurement, chief among which are low price, simpler construction with greater reliability and ease of operation, combined with economy of upkeep.

The foreign machine generally is a ponderous affair and represents exactly the engineer's idea of what an automobile should be. The American manufacturer, on the other hand, with characteristic foresight and business wisdom, recognized very early that an important item in his success would consist in catering to public demand as soon as such demand would assume well defined shape. The direct result of this policy was the low-priced and economically maintained American runabout, and the light touring car for all-around use, both of which have taken a highly important place in the home market, and will be largely the means by which the American maker will acquire predominance in foreign fields. There is no doubt that had the foreign designer refrained from making his smaller cars exact copies of his larger and higher-powered ones, his neglect even of the home market would have been less marked in its consequences.

The American automobile is a nearly perfect car, and this result was attained not only by the use of good material and the most skilled workmanship, but also by providing interchangeable parts, so that it is possible to replace any portion of the mechanism quickly and with little cost. Here is another advantage of which the foreign manufacturer deprived himself to some degree, for the success of the American vehicle would have been less marked without this interchangeability of parts. In addition to these two strong elements of American superiority—low price and standardization of parts—there must be mentioned, third, but not least, the reliability of the higher priced American cars. The power, strength and durability of the best American cars are really marvelous. These cars are built by engineers of the highest class, and made by manufacturers who have had years of experience in making high grade engines.

While it is a fact that the foreign manufacturer suffers from the evils of overproduction, it is true that many American manufacturers find themselves at the other extreme, in generally being oversold at a time when the yearly production is barely under way. Then, too, the confidence of the public increases as it becomes evident that the American automobile has reached a stage of standardization, where it no longer will be subject to abrupt constructional changes. This ideal has been reached, and the motorist finds ready for his use a vehicle admirably adapted to his needs.

A 1908 AMERICAN RUNABOUT.

THE CITY OF BALTIMORE.

The Gateway Between the North and the South—Center of Great Financial Interests—Something About the State of Maryland.

BY GEORGE L. STANLEY.

BALTIMORE, commercially, politically and socially, is a connecting link between the North and the South.

The beautiful "City of Monuments" by the shores of the Chesapeake lies at the gateway to the rich cotton, tobacco and sugar cane fields of the Southland, and is at the same time the Eastern and Southern terminus of transportation lines which tap the great coal and iron mining districts of West Virginia, Pennsylvania and Ohio.

More than this, it is the fourth shipping point in importance of the entire North Atlantic coast, being connected by fast passenger and freight steamship lines with all the leading ports of Europe, including London, Leith, Glasgow, Liverpool, Hull, Hamburg, Bremen, Antwerp and Rotterdam.

The citizens of Baltimore combine the hospitality and social charm of the Southerner with the business enterprise and acumen of the Northerner.

This latter is, perhaps, best evidenced by the facts that the city was one of the first in the United States to install a complete and modern electric railway system, and that it was the first community to realize the possibilities of bonding companies. These companies, making a business of furnishing bonds to individuals undertaking trusteeships or other employments involving large trusts, were brought to a high state of perfection there. They represent an important part in the city's financial activity, over $25,000,000 of capital being invested in Baltimore bonding companies.

Although very generally spoken of as being on Chesapeake Bay, the city of Baltimore is, as a matter of strict geographical fact, on the Patapsco River, 14 miles from its entrance to the Chesapeake Bay. The city has an area of 32 square miles and a population of 600,000. Its assessed property value is $340,000,000, which gives an excellent idea of the prosperity of the community.

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CHARLES STREET, BALTIMORE.

Particularly rapid has been the growth of the city's manufacturing interests. In 1880 the capital invested in manufacturing enterprises was $38,500,000. In 1900 this had increased to $92,700,000, and at the present time it is estimated at no less than $160,000,000—and this despite the effects of a conflagration which was one of the largest and most costly in the history of the country.

The Baltimore fire took place in 1903, and consumed the greater part of the central business district, wiping out great office buildings and destroying the homes of banks, newspapers and wholesale establishments. Fire apparatus and fire fighters were brought by special trains from New York, Philadelphia, Washington, Newark and other cities to help quench the flames, which were only subdued after days of stubborn fighting and after a loss of many millions of dollars.

Baltimore's annual exports are in excess of $100,000,000, the chief items being breadstuffs, sheep and cattle, copper, cotton, provisions and tobacco.

Manufactured articles exported include furniture, electrical goods, belting, jewelry, leather goods, printing machinery and numerous other lines.

The city has an unusually high reputation for the quality of the goods offered for sale, this being especially shown in retail lines. Fastidious buyers go long distances to purchase of Baltimore shops. Residents of Washington, distant an hour from Baltimore, often go to the latter city when in need of the highest grades of goods.

In this connection it is perhaps well to point out to the foreign reader that Washington, the capital of the United States, is not, as are most of the European capitals, one of the leading manufacturing and industrial centers of the country. While it has some manufacturing interests, yet the city is almost entirely given up to the executive business of a nation of 70,000,000 people—obviously no small undertaking.

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ITALIAN STEAMSHIP, BALTIMORE.

Let the traveler journey two hours north of Baltimore and he is in the thick of the manufacturing interests of the North. If he go two hours the other way he is in the agricultural and pastoral region of the South, with its temperate climate and fertile soil. Thus the city has a unique position.

Its men of wealth aided materially in developing the resources of the South, and to-day Baltimore has over $100,000,000 invested in that part of the country.

What the cod fishing fleet is to Boston, the oyster boats are to Baltimore, for Chesapeake Bay oysters are highly esteemed, and the supplying of this succulent bivalve to the epicure is a by no means unimportant part of the city's interests and wealth.

As over 6,000,000 bushels of oysters are annually inspected at Baltimore, it will be seen that an enormous revenue is derived from this shellfish industry.

Baltimore is the capital of Maryland, one of the thirteen original States which formed the United States. The State's population at the latest national census was 1,188,044. When Baltimore's population is deducted, it is evident that the State is not thickly settled. There are no other large cities in the State, and its interests are chiefly agricultural. There are 46,012 farms in the State, of which 30,655 are occupied by owners. That the balance of trade, from an international standpoint, lies in Baltimore's favor is shown by the fact that the city's imports average less than $20,000,000 per year, whereas its exports, as already stated, are over five times that sum.

THE GRAPHITE INDUSTRY.

Although this country consumes about 35 per cent. of the world's total output of graphite it furnishes but 20 per cent. of it. The amount imported into the United States in 1906, chiefly from Ceylon, was valued at $1,554,212, and the value of the domestic production was only $340,239.

The purest graphite is carbon with 0.05 to 0.20 per cent. of hydrogen, but the commercial grades of crystalline graphite contain clayey impurities, even the best, such as some of that from Ceylon, comprising as high as 15 per cent. of ash.

The distinction between crystalline and non-crystalline or amorphous graphite is not easily defined. Some of the graphite that is termed amorphous differs from crystalline graphite only in the microscopic size of the flakes; on the other hand, amorphous graphite may be more closely related to anthracite coal than to crystalline graphite. An instance of this is seen in the Rhode Island deposit, which was formerly known and reported as anthracite coal, but which now furnishes commercial graphite.

The material has been reported from all of the Eastern and many of the Western States in which the older crystalline rocks occur, and in most of these the deposits have been at times actively prospected. Its steel gray to blue black color, extreme softness, black streak and greasy feel make it easily recognizable and form the basis of its industrial importance.

The production of artificial graphite has steadily increased since 1897, and its use is extending rapidly.

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BALTIMORE'S OYSTER FLEET.

THE NEW YORK AUTOMOBILE SHOWS OF 1907.

Splendid Success of the Exhibitions Held by the Industry's Two Great Trade Organizations.

A CORNER OF THE GRAND CENTRAL PALACE SHOW.

THE American automobile industry is represented by two great trade organizations — the American Motor Car Manufacturers' Association and the Association of Licensed Automobile Manufacturers. Each of these two bodies holds its own annual exhibition, and although the later shows at Philadelphia, Chicago, Detroit, Buffalo, Cleveland, Pittsburg, etc., are not without their relative value, the New York shows, for obvious reasons, attract the widest attention and the greatest number of visitors, not only from the United States but also from foreign countries. For here the result of the automobile designer's work, so carefully guarded during the experimental period, is for the first time exposed to the gaze of the public as well as to that of the competitor; a whole year's engineering progress presents itself to the criticism of the observer, and there is no doubt that the Metropolitan Automobile Shows, aside from the opportunity of the manufacturer and dealer for establishing new trade relations, possess a decided educational value to manufacturer and motorist.

VIEW OF THE MADISON SQUARE GARDEN SHOW.

The eighth annual exhibition of the American Motor Car Manufacturers' Association was held in the Grand Central Palace from October 24th to October 31st, and the show of the Association of Licensed Automobile Manufacturers in Madison Square Garden from November 2d to November 9th. Both shows were unqualified successes.

The Palace exhibition united no fewer than 277 exhibits, of which 68 showed complete automobiles; 6 commercial vehicles; 6 motor buggies; 2 electric automobiles; 2 motorcycles, and the remainder parts and accessories. A similar array of cars was lined up in Madison Square Garden, where 34 different makes of gasoline cars, 9 makes of electric vehicles and one steam automobile were on view, with the customary accompaniment of parts and accessories, motorcycles and commercial cars.

One of the conspicuous features of the shows was the increase in six-cylinder motors, of which sixteen makes were seen at the Palace and ten makes at Madison Square Garden.

Closer observation likewise reveals a considerable increase in the number of new runabouts of the high-wheeled buggy construction, a type which seems to find increasing favor in the West, where the conditions of the roads make the universal use of the conventional automobile with little road clearance impracticable.

THE MANUFACTURE OF PREPARED PAINTS.

The Scientific Development of a Great Industry—Details of the Processes Which Turn the Crude Materials Into the Finished Product.

BY ERNEST T. TRIGG,

Of the Paint Manufacturers' Association of the United States.

THE manufacture of prepared paint was started only forty years ago. The intrinsic merit and popularity of the idea of prepared paint, ready for use, is proved by the fact that the sale of prepared paint in the United States has grown from nothing in 1866 to over 80,000,000 gallons in 1906.

An examination of the Government records shows the first patent for a paint compound to have been issued July 16, 1867, to D. Averill, Newburg, Ohio, U. S. Patent No. 66,773. A description of the paint compound is covered by this patent, being, in brief, an enamel paint, which sold, according to the best recollections of old-timers in the paint business, at from $2 to $3 per gallon.

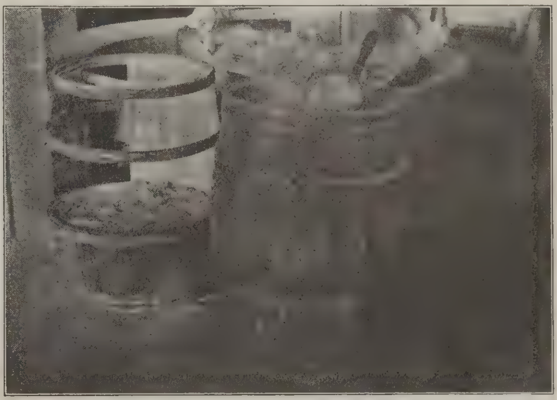
This patent was shortly followed by further patents along the same line, and certain manufacturers from that time on applied themselves assiduously to the task of manufacturing a prepared paint which was right in every way.

It was not long before these manufacturers, partly through their own experiments in a practical way, and partly through the advice and suggestions of practical painters, found that a prepared paint could be made which for all practical purposes was a great improvement, from the standpoint of utility, over the use of strictly pure white lead in oil, which meant hand mixing in the crudest sort of a way. That was the beginning of the present era of high-grade prepared paints, scientifically combined by machinery.

A BARREL OF CRUDE MATERIAL BEFORE CHASING.

It is safe to say that it is only within the last ten to fifteen years that prepared paint manufacturers generally have realized the immense possibilities for business in the prepared paint line. With a full realization of the possibilities in the business, a majority of the paint manufacturers also realized the fact that in order to build up a trade it was necessary for them to supply a product which carried with it the maximum of durability, uniformity, ease of working and general satisfaction.

The pigment base of white paints, and the white base in tints where white is used as a base, in the best paints is composed of white lead, oxide of zinc and a percentage, varying from 10 to 20 per cent., of reinforcing pigments.



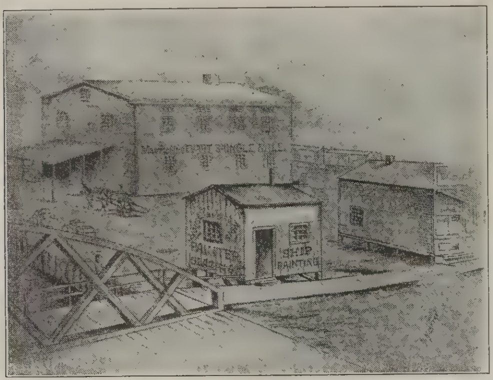
SAME BARREL OF CRUDE MATERIAL AFTER CHASING WITH SIX GALLONS OF OIL ADDED.

In order that the reader may gain an idea of the increase in the sale of prepared paints and its effect upon the sale of white lead in oil, the following figures are given, being taken from the United States Geological records:

White lead in oil, 1895	151,921,669 lbs.	= 76,000 tons
White lead in oil, 1905	125,534,000 lbs.	= 63,000 tons
Decrease	26,378,669 lbs.	= 13,000 tons
Dry white lead, 1895	29,113,819 lbs.	= 15,000 tons
Dry white lead, 1905	147,818,000 lbs.	= 74,000 tons
Increase	118,704,181 lbs.	= 59,000 tons
Zinc oxide, 1895	41,420,000 lbs.	= 21,000 tons
Zinc oxide, 1905	137,206,000 lbs.	= 69,000 tons
Increase	95,786,000 lbs.	= 48,000 tons

As practically all of the dry white lead and oxide of zinc is purchased by paint manufacturers and by them converted into the finished product, it is interesting to note an increase in dry white lead of over 400 per cent. and in zinc oxide of 230 per cent., as against a decrease in the sale of white lead in oil during the same period of 17.4 per cent.

What is the reason for this remarkable increase? It can be ascribed to two principal causes. First, the undoubted merit of prepared paint, as demonstrated by actual experience and durability tests; second, it is an up-to-date product, meeting in the highest degree modern conditions. It is the natural outgrowth of a commercial desire to meet in the highest degree the present needs of the painter, architect and house owner—"present needs," because modern conditions have led to the evolution of prepared paint to meet an absolute requirement.



AN EARLY FACTORY. FAR DIFFERENT FROM THE GREAT PLANTS OF TODAY.

Architects and builders fully realize that mill work is an absolute necessity in modern building, and that were the hand work of our forefathers resorted to there are not enough skilled carpenters and carvers in the land to turn out a fraction of the work required, and that in many ways accurately set machines will turn out more perfect work than was before possible. The work of the carpenter becomes that of an assembler or constructor from machine-made products. So in painting. The increased demand for applied paint and men to apply it has grown tenfold beyond the supply possible under the old apprenticeship plan, whereby a boy grew up in the shops to gradually become familiar with all the details of breaking up, mixing and grinding colors.

TESTING FORMULAS.

A visit through any one of the up-to-date paint plants and a careful review of the systems in force to insure all crude material being up to standard, before any part of it is allowed to go into the manufacturing department, would be a revelation to most people.

From the crudest methods of manufacture, when the pigments and liquids were mixed together in a barrel by hand, with paddles, forty years ago, this immense industry has grown to a point where it is to-day on an absolutely scientific basis, both so far as combination of material is concerned, method of manufacture, matching of shades, etc., etc.

LABORATORY.

The United States Census figures for 1905 show the value of the paint sold in the United States that year to be over $67,000,000, while the capital invested in its manufacture was over $55,000,000. Next to the iron and steel industry, there is probably more capital invested in the manufacture of prepared paint and kindred lines in the United States than any other one material used in building construction.

A laboratory in connection with the manufacturing department is considered absolutely indispensable to-day to the up-to-date, progressive manufacturer. This is necessary so that all crude materials can be examined chemically as well as physically.

In the manufacture of a scientifically prepared paint two kinds of knowledge must be applied, namely, practical and chemical. The chemical knowledge, without the practical knowledge, can give only the component parts of the composition and determine only whether or not the material examined is up to the standard. The vital points in the combination are the practical ones—namely, structure of the material, method of combination and many other equally essential points.

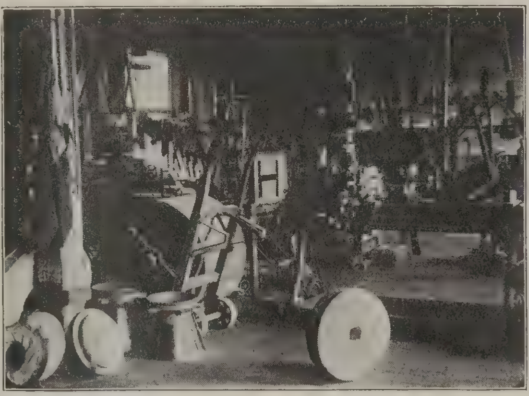
The manufacturers of standard brands all have their own standards and specifications for the examination of crude material, based not only on the physical and chemical examination, but practical use of the materials in combination with their formulas. Every article which enters into their products must pass this standard. Averaging, as some plants do, hundreds of thousands of pounds of crude material for each working day of the year, it might seem impossible to make an examination of all products used. Without a system or basis of operation it would be so, but these plants work under a system making this examination so simple that the manufacturing department is never delayed.

In their specification books is to be found a fund of information embracing the tabulated results of knowledge gained, in some instances by over half a century of practical experience, and its value may be judged when it is stated that a duplicate copy, which is kept up to date, is invariably carried in a safe deposit vault, far out of possible harm's way. The importance of the information to the purchasing, receiving, laboratory and manufacturing departments can best be realized from an analysis of a page from a specification book in use in one of the large paint factories in this country.

Upon receipt of a shipment or delivery, samples are taken by the receiving department, and before being placed in stock the receiving department must have an O. K. ticket for the goods.

In carload deliveries, five samples taken from different barrels constitute an examination. On smaller shipments an examination is made of the contents of each package. Let us follow through one of these deliveries and examinations.

The first thing each morning, the contents of all cars of crude material in freight on the team track are sampled and the barrels numbered. The receiving department's report is filled out and together with the samples is turned into the laboratory, where the examination is made according to their specifications. The results of the examination are then recorded and a recommendation is made for either the acceptance or rejection of the goods. The receiving clerk's memorandum is filled in accordingly, and if O. K. the goods are put into stock.

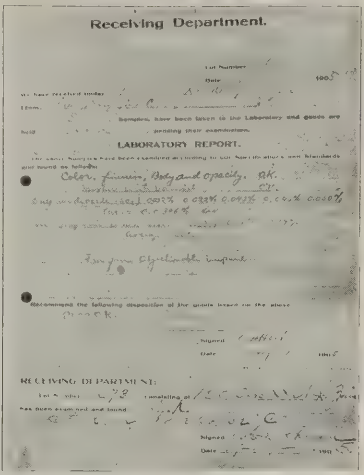


A CORNER OF THE MACHINE SHOPS.

Any chemist can take a sample of carbonate of lead and determine whether it is a pure basic carbonate; or any paint man who is familiar with the use of a blow-pipe can reduce a sample of pure lead to the metallic state, but he cannot determine from such a test the important points; namely, its freedom from acid, its structure, if crystalline, and its freedom from metallic lead.

One of the most important equipments connected with the testing department used in the examination of crude materials is the microscope.

With this it is possible to determine at a glance the fineness and structure of the crude materials and measure the size of the particles, even though they are infinitely smaller than the meshes of any sieve manufactured. This examination will lead at once to the detection of samples which are crystalline and too coarse to meet the manufacturer's specifications. The limit of size of separate particles visible to the naked eye is about 1/100 of an inch. The microscope used in this particular factory will magnify 1,200 diameters. This means more than 1,200 times the actual size of the particles. It means 1,200 times its length and 1,200 times its breadth, giving a visible area of 1,440,000 times that of the site of the original particle. It is only on special occasions that it is necessary to use this extremely high power, ordinary examinations being made at a magnification of 100 to 750 diameters.



Receiving Department.

LABORATORY REPORT.

Color, fineness, Body and opacity. OK.

O. K.

RECEIVING DEPARTMENT:

RECEIVING DEPARTMENT FORM.

To determine the actual size of particles too small to be determined by any sieve or silk bolting cloth, a micrometer scale or ruler is connected with the microscope. The actual divisions on this ruler are 4/10,000 of an inch apart. The finest silk bolting cloth manufactured will allow particles 1/100 of an inch to pass. While such particles are barely visible to the eye, they will represent 40 divisions on this ruler. The particles of an opaque, well-corroded lead will run from 1/10,000 to 1/20,000 of an inch in diameter, and to pass the manufacturer's specifications must show under the microscope the formation of basic carbonate of lead and not a crystalline lead, since crystalline lead, no matter how pure it may be chemically or under the blow-pipe, would be lacking in opacity and durability.

The inspection of zinc is largely chemical rather than physical, since it is sought to avoid principally the dangerous sulphur compounds. Owing to the fact that zinc oxide is manufactured by subliming as a vapor or steam, the particles are perhaps the finest of any pigments used in the manufacture of paints, averaging about 1/50,000 of an inch in diameter. In order to show the size of the particles and structure of zinc it is necessary to magnify it 1,000 diameters, which is twice the magnification necessary for white lead.

A similar comparison could be carried on down through the different raw materials, but the points already brought out are sufficiently illustrative of the reasons why it is found necessary to look carefully into crude materials.

DRESSING MILL STONES.

The space a manufacturing plant may occupy gives little idea of its capacity. What really counts are the systems in force and the manner in which the space is utilized. Neither does the amount of machinery give a basis for calculating output. It is the condition in which the machinery is kept and the system under which it is operated that tell the tale.

The sharper and the better the condition in which the mills are kept the more and the better goods will be turned out, as the more thorough and the finer the grinding and the more thorough the incorporation of the pigment with the vehicles, the greater will be the hiding or covering properties and the durability of the finished product.

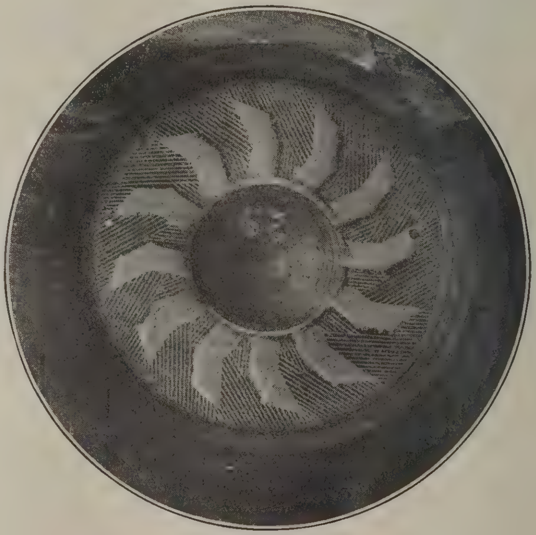
The machinery in the larger plants is all of their own design and make, and with their own machinery departments these factories are enabled to keep their machinery always in the best condition. In such plants the output is figured daily, and if the amount is not up to the full capacity an investigation is made at once and any necessary changes are ordered.

To one not fully conversant with paint grinding, it may seem that a paint mill is a paint mill; but there is as much difference in paint mills as there is in paint pigments. The kind of stones and the style of the dress must be carefully considered according to the character of the product to be ground, and the importance of the millwright's position in a properly equipped paint factory is next to that of the superintendent. He must know the character of every pigment to be ground and have mills differently constructed to meet these requirements.

The number on the mill is a very important factor in turning out a properly prepared product. These numbers are the keys to the construction of the mill, and from the tabulated form the foreman of the department knows just what mill can be used to the best advantage for each product. If the product to be ground is of a hard, flinty structure, he knows that Mill No. 8, for instance, will not answer for this, as it is constructed of soft stones of an open feed, and he must select a mill with hard burr stones of close dress.

If linseed oil is the life of paint only to the extent of its protection by a pigment, the more thoroughly the pigment can be combined with the linseed oil the greater the protection which it will afford. If it was possible to make a perfect mixture whereby every particle of pigment could be brought so closely together that there would be absolutely no space between them and a single painting pigment, or combination of pigments could be obtained which would expand and contract equally with every paintable surface, it would be necessary to paint a surface but once.

As an illustration, let us take a mixture of dry Venetian red and linseed oil. It is not uncommon for a farmer to buy 100 pounds of dry Venetian red and 10 gallons of oil to paint his barn; 100 pounds of dry Venetian red, mixed by hand with 10 gallons of linseed oil, will make exactly 14 gallons of paint. Let us take this 14 gallons of paint, put it in a stone jar so there will be no loss, cover it over tightly and let it stand for twenty days and then remeasure. We now find we have in place of the original 14 gallons but 12¼ gallons. There has been no loss, either by evaporation or other cause; what has become of the gallon and three-quarters?



STONE DRESSED, READY FOR USE.

In the original mixture the particles of pigments were separated and held in suspension by the oil. By allowing the mixture to stand, the pigment had absorbed the oil, drawing the particles closer together and reducing the bulk. If painting had been done with the mixture when

A THIRTY-INCH MILL.

first prepared, the surface coated would have been full of oil spaces, and if a slow-drying raw oil had been used, the pigment, having a greater affinity for the oil than the surface, would have absorbed the oil and robbed the surface of its binder. If a quick-drying boiled oil had been used, the coating would have hardened over before the pigment could have become satisfied, and a porous surface of practically dry pigment would have been the result. In painting with the mixture which had been allowed to stand greater opacity and durability would have been obtained; the pigment being satisfied with oil would not have robbed the surface of its binder, and the particles being brought closer together would have given a less porous surface and afforded greater protection to the linseed oil. In a simple mixing process by light machinery the mixture cannot be left in the mixer long enough to take the oil on by absorption, and the incorporation of oil and pigment is dependent entirely upon the grinding.

As a further illustration of the thorough incorporation between oil and pigment, obtainable under a proper process of manufacture, let us take zinc. On account of its extreme fineness and sublimed process under which it is made, it reaches the manufacturer as a very light and bulky pigment.

A zinc barrel has 42 gallons liquid capacity and holds 300 pounds of dry zinc. The zinc is packed into the barrel by machinery, and it would be impossible for one to add fifteen pounds of zinc and put in the head. Let us empty this barrel of zinc into a chaser and add six gallons of oil. It will be found that the combined mixture can be put into the barrel from which the zinc was taken and the barrel be less than one-third full. In other words, if the incorporation has been thorough, three barrels of zinc and eighteen gallons of oil can be put into the package which was originally filled with 300 pounds of dry zinc.

ONE OF THE POWERFUL CHASERS.

Grinding and incorporation are two separate and distinct processes. Incorporation of vehicle and pigment consists of saturating the pigment with the vehicle, and eliminating all spaces by bringing the particles closer together. Grinding consists of tearing the pigment to pieces, changing its structure or breaking up the particles, to bring out greater strength or opacity.

TWO 600-GALLON MIXING TANKS.

Uniformity of grinding is an essential feature and is dependent upon the construction of the mill, the condition of the stones and uniform feed.

The principle of fine grinding is to feed only enough color into the mill to keep the face of the stone covered, and gradually force the color from the eye to the skirt of the stone, and to obtain a uniform finished product the feed must be constantly watched.

The dress of a mill stone consists of the deep or feeding furrows and the fine cracks on the face which tear the particles to pieces as it passes between the stones. These fine cracks by constant friction wear down quickly; thus the importance of keeping a mill dressed is apparent.

There is probably no pigment which will better illustrate the difference between grinding with a sharp mill under the tearing process and a dull mill under the squeezing process than lampblack.

The formation of lampblack can best be described as a body with hundreds of legs or arms extending from it. On account of its structure, as well as its light gravity, lampblack, in combination with other pigments in liquid form, is the hardest of all pigments to keep from separating.

If lampblack is ground in oil under the squeezing process these legs or arms are extended, with the result that when mixed in oil with other pigments its tendency to flood or separate is aggravated. If properly ground in a sharp mill under a tearing process, its legs are broken or torn off, with the result that when used in a mixture less separation or flooding takes place.

The mixing tanks are of oval construction and so arranged that the mixing is done from the bottom up. Flat paddles arranged on a revolving shaft beat the vehicle and base together, and force out through a vent at the top of the tank any gases or air which may form in the process of mixing. The tinting tanks are also equipped with mixers, which not only facilitate the thorough mixing in of the coloring material, but keep the contents of a uniform consistency while filling packages.

A ROW OF 200-GALLON SHADING TANKS.

From the foregoing it will be seen that, as stated in the first part of this article, the manufacture of scientifically prepared paints by machinery has been reduced to an absolute science, and that scientific principles underlie the manufacture of a prepared paint intended to produce the best results from the standpoint of covering capacity, appearance and durability.

There is probably no line of commercial industry which has grown in so short a space of time from nothing to the immense proportions of the present day. The development of this business along scientific and practical lines has been marvelous. The prepared paint business of to-day is an exemplification of the progress of the times. It stands as a monument to the years of hard, conscientious work and study of those men who have devoted a lifetime to the solving of the complex problems of composition and methods of manufacture.

COKE INDUSTRY IN OHIO IN 1906.

Although Ohio ranks fourth in importance among the coal-producing States, it has never attained prominence as a coke producer, partly because much of the coal mined in the State makes an excellent fuel in its raw state and partly because of the proximity of the higher grade coking coals of Pennsylvania and West Virginia. The operations of the Rothberg by-product recovery plant at Cleveland, which was in full blast in 1905 and 1906, and of the Otto-Hoffmann plant at Cincinnati, together with an increased production of the beehive ovens at Leetonia, however, have given the industry in this State a position of considerable importance. The coke product of Ohio in 1905 was more than two and one-half times that of 1904, amounting to 277,130 short tons, against 109,284 tons in the preceding year, while the value increased nearly 190 per cent.—from $337,606 to $970,897. The statistics for 1906, collected by the United States Geological Survey, show a further increase to 293,994 short tons, valued at $1,013,248.

Of the eight coke-producing establishments in the State, two, with a total of 170 ovens, were idle both in 1905 and 1906. The 405 active ovens produced an average of 726 tons of coke each.

Over 80 per cent. of the coal used for coke making in Ohio is unwashed run-of-mine. Of the slack coal used in 1906, about 81,000 tons, or a little over one-half, was washed.

The coke production in the United States in 1906 will be discussed in an advance chapter from "Mineral Resources of the United States, Calendar Year 1906," soon to be published by the United States Geological Survey.

QUITE A WASTE.

Writing of a high-class steam engine, a well-known scientist gives the following account of the proportion of energy contained in the coal consumed which is converted into useful work. The energy of one pound of coal is, say, 12,000,000 foot pounds; of this 4,000,000 go up the chimney or get wasted by radiation as heat, and 8,000,000 foot pounds of head energy reach the engine in steam; of this, only one-thirteenth, or 600,000 foot pounds, is converted into mechanical energy and given to the piston; the other twelve-thirteenths are wasted. Only 500,000 are given out by the engine to the shaft. That is, only one twenty-fourth of the energy of coal consumed reaches the shafting.

TEXTILE ESTABLISHMENTS.

Textile establishments in the United States in 1905 numbered 4.563, according to a census bulletin just issued. They had a combined capital of $1,343,324,605, distributed as follows: Cotton goods, 1,077; cotton small wares, 77; hosiery and knit goods, 1,079; wool manufactures, 1,213; silk and silk goods, 624; flax, hemp and jute products, 133; dyeing and finishing textiles 360. The total number of establishments shows a net increase of 251 since the last census. The salaried officials, clerks, etc., employed numbered 24,116, and the average number of wage-earners was 739,239. Salaries and wages paid were $32,496,560 and $249,367,277, respectively.

MAINE WOOLEN INTERESTS.

The Maine Woolen Manufacturing Association was formed October 23. The object of the organization is for mutual protection in business and the safeguarding of interests in national and State legislation. A committee was appointed to frame bylaws and articles of association.

ARCHITECTURAL METAL DEVELOPMENTS.

The Growing Use of Metal Ceilings and Shingles, Roofs and Cornices and the Improvements Introduced in Their Manufacture.

BY GEORGE E. WALSH.

ITALIAN RENAISSANCE METAL CEILING DESIGN.

THE need in towns and cities of building materials which will take the place of wood so that the fire hazard is materially reduced has been instrumental in the development of a line of architectural metal devices of great importance. The increasing use of terra cotta and concrete for the walls of fireproof buildings has made it necessary to devise some methods of completing the fire protection by utilizing metal for roofs, doors, window frames, skylights, ceilings, and even inside walls and cornices. Architects are seeking more and more to eliminate all wood from the modern fireproof house, and this can be accomplished only through the use of metal substitutes. Concrete, terra cotta and bricks cannot be moulded to suit all of these demands, and a metal which can be pressed into many shapes in the manufacture, and then applied in small units, is the most suitable for this work.

Metal shingles, ceilings and inside linings of walls and partitions could not be extensively used a few years ago for general purposes on account of their cost; but improved machinery for manufacturing them has made them today nearly as cheap as wooden shingles or plaster ceilings. A great variety of metals, from tin and galvanized iron to a copper alloy, are used for such purposes. Equally varied are the machines for pressing and stamping these metals into the required shapes. New patents have been granted in endless variety in the last few years for the different improvements in building materials, and the architect and builder has a wide list of articles to select from.

The chief advantages of these architectural metal improvements are their fireproof qualities, great durability, lightness in weight and easy shipment. The metal shingles, for instance, are packed in squares sufficient to cover 100 square feet of surface of roofs, and such a square is lighter in weight and more compact in form than wooden singles to cover the same amount of surface. The new machines used for stamping or pressing these shingles have produced an article which can be applied to a roof with a minimum of unskilled labor. By means of interlocking devices the shingles overlap and make a continuous waterproof roof. They cannot warp, and by means of making sufficient allowance in the interlocking devices to take up the contraction and expansion they are not injured by extremes of weather. They are applied without the use of solder or special mechanic's tools, and with a minimum of nails.

The metal shingles are made of the best quality of terne plate, galvanized iron or copper alloys. The former are lighter than the wooden shingles, and the second grade only slightly heavier, but much lighter than slate shingles. The copper shingles are the heaviest, but they are lighter than slate shingles. The cost of a roof depends as much upon its durability as upon the initial expense of installing it. From experience so far the best metal shingles will outlast the best wooden shingles by twenty or thirty years. Moreover, the metal shingles are pressed into any desirable shape or pattern needed to give an ornamental effect to the roof. This fact has induced architects to employ them in a great many cases where architectural designs could not easily be carried out with wooden shingles. For repairing metal roofs it is not necessary to tear off the whole of the roof to make slight alterations. A small section of two or three shingles can be removed to replace a damaged shingle. Angles and gutters are made secure by the same interlocking methods, and the peak is finished off with metal roof cresting, which secures a watertight finish and a very ornamental appearance. The ridge roof pieces come in various sizes, and it is possible to finish off any desired lengths of the ridge without wasting good material.

Ten years ago there was not a metal shingle on the market, and even five years ago their use was very limited. Today many millions of them are annually sold, and nearly a score of manufacturers are putting them on the market. Their popularity is extending so rapidly that they will probably within the near future replace the old wooden shingle almost entirely. The increasing cost of lumber is naturally making wooden shingles more expensive every year, and today it costs twice as much in many localities to shingle a house with wood as it did ten years ago. Owing to the simplicity of shipping the metal shingles in convenient packages they are now sent to all parts of the world, and represent a valuable portion of the country's export trade. Sheet and corrugated iron roofing materials are already used to a large extent for sectional and portable houses, and the new metal shingles are following in their wake for houses where a little better finish is desired.

Metal ceilings have likewise proved extremely popular in demand, and their employment for nearly all kinds of public and residential buildings has stimulated manufacturers to invent new pattern machines to meet changing conditions. The metal ceilings and sheets for side walls are practically dust proof, moisture proof, vermin proof, and to a certain extent fireproof. They are also economical, sanitary and permanent. They are stamped in the greatest variety of patterns, and the fear of securing a monotony of interior effect is thus obviated. They are also made in plain surfaces, which can be papered or painted in the ordinary way. The troubles of cracked and falling ceilings are thus obviated, and if a slight interior fire should start in a room it would not readily spread to the adjoining rooms. By inclosing each room practically in a metal lining, the living portions of the house are made as safe and sanitary as possible. Like the metal roofs, patents have been secured in recent years governing interlocking devices for ceiling and side wall metal squares, so that a continuous surface can be made without any trouble. Such a continuous and unbroken surface prevents vermin of any kind from entering through it. It also helps to equalize the atmosphere by preventing draughts and moisture from entering.

The manufacture of stamping and pressing machines to produce metal walls and ceilings is quite an important adjunct of this business. Some manufacturers carry as many as several hundred patterns in stock, and are always ready to accept large orders for special designs. Some of our largest public buildings have been finished off inside with metal ceilings and partitions from patterns designed by the architects. The cornices, dado and friezes made in ornamental metal are almost as varied as those executed in wood. Posts and pillars are likewise inclosed in these metal sheaths, with fluted surfaces and elaborate column projections.

Perfect imitations of modern high-class wall coverings are made of the metal, giving beautiful panel effects to the wainscot, plain walls above, and elaborate friezes and mouldings above. The ceilings are likewise made plain or pressed in panels ready for decoration. The whole interior of the room is thus designed carefully and executed in pressed metal. All of these metal ceilings and side walls are made of sheets of mild steel, usually of 28 or 29 gauge. The sheets of various sizes are then placed between dies and subjected to powerful pressure or to the action of a machine hammer. The latter method is said to produce sharper angles. In factories and lofts metal ceilings are of special value, owing to the fact that where heavy loads are rolled across the floors above there is no loose plaster to crack and loosen. For factory purposes they are being used more extensively than any other ceiling covering. But their use is rapidly extending to many other classes of buildings, such as hotels, apartment houses, restaurants, theatres, churches and public halls, and are employed equally well in parlors, kitchens, bathrooms, lavatories, banks, restaurants and buffets. Their use in fact is almost endless, and when their economy and sanitary qualities are considered they are unexcelled.

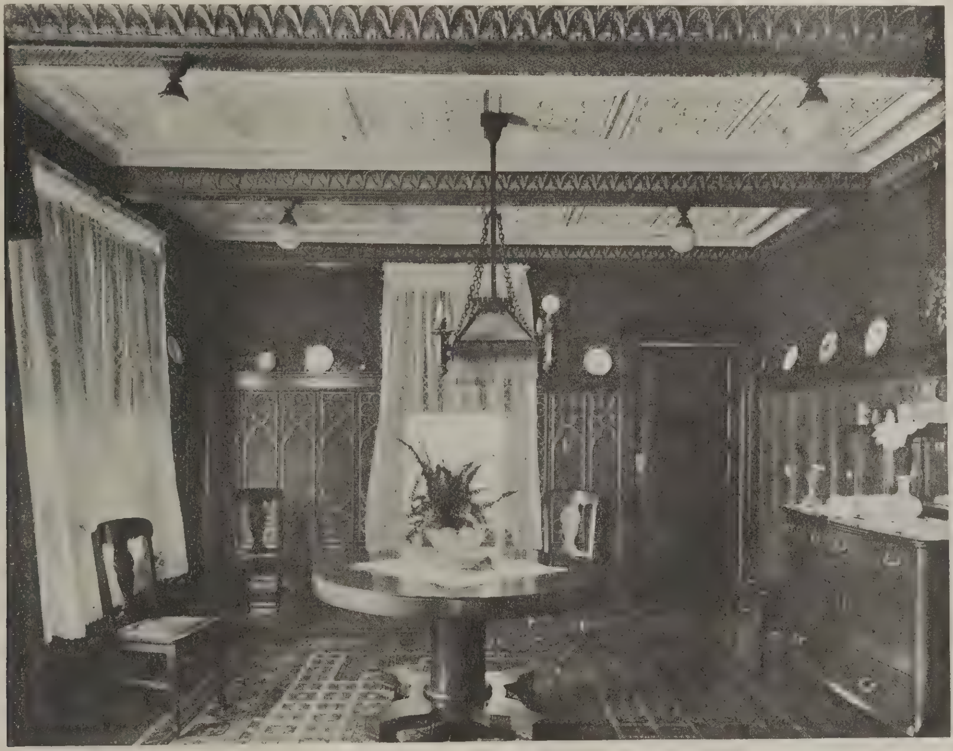
The exterior use of metal sidings for houses is somewhat new, but here too the adaptation of metal has worked some important changes. Corrugated iron sides for portable houses and contractors' sheds have been in use for a number of years, but in these no attempt has been sought to produce an artistic building. In fact, it was considered impossible to produce an artistic house of metal, and the workers in sheet iron and steel made no effort to encourage such a development. But in the last few years the great popularity of stucco for the exterior finish of a house has opened a new field for workers in pressed steel sidings. A low grade siding of sheet steel, with roughened outside surfaces, has been produced and tacked on the framework of buildings, and over these stucco or plaster has been applied. The result is that a strong fireproof and permanent house is secured at a minimum expense. The stucco preserves the metal sides and prevents them from rusting or decaying. With the inside of the house similarly equipped with metal squares, the house is practically an iron or steel structure that offers the maximum of comfort and durability at a minimum of expense.

Metal doors and window frames have also received unusual popularity in many sections of the country where either lumber is very expensive or the fireproof question renders the use of wood undesirable. The doors in effect consist of wooden cores encased in thin sheet metal. The metal covering is stamped in panels to suit the rest of the interior designs, and when applied and painted or stained to represent hard wood they deceive the most critical. Hollow sheet metal doors are also made with no interior core of wood. They are made in one or two continuous sheets, and braced inside so they will not bend or twist out of shape. They are much lighter than solid wooden doors, and in localities where wood is expensive serve a very distinct purpose.

Wooden window frames are likewise being supplanted by metal or metal covered frames. This is due both to the greater fireproof advantages thus obtained and to the increasing cost of lumber. The improvement in machinery for pressing and stamping the metal casings at very little cost is a factor also in their favor. Outside and inside window frames are made today in a great variety of artistic shapes, and painted to imitate wood. They prove practically indestructible, and greatly increase the general value of the house. Machines for stamping a window frame almost out of a single sheet of metal have been invented, and others press the frames in metal and leave a space inside for a core of wood.

Architectural metal work includes a great variety of other articles for household construction, such as outside cornices, skylights, finials and rolling doors. All of these are being cheapened in cost through the improvement of machines for converting the sheet metal into commercial articles. The lessening cost of insurance on buildings thorough the more general use of metal for houses is a feature of the question that has an important bearing. Gradually but surely the public buildings of our cities and towns are being protected from fire hazards, and this is one of the strongest points in favor of a more general use of metal instead of wood for the finishing off of houses.

The export of metal sides, shingles, skylights and ceilings is also receiving attention. Sectional houses made of metal are easily transported, and the United States Government has shipped several thousand tons of architectural metal to the Isthmus of Panama for the use of the workmen and officers engaged in digging the canal. These finished products enable the workmen to erect cool and comfortable buildings within a very short time, and when work is finally abandoned on the isthmus the architectural metal parts can be removed and used elsewhere. Contractors are making greater use of sheet steel and corrugated iron for building temporary structures for their workmen. In the Northwest a great number of portable buildings are being put up for permanent use, and the shipment of the light structural metal to the Northwest in Canada has also attained a considerable degree of interest.



RESIDENCE OF MR. GEORGE R. EDWARDS, CINCINNATI, OHIO, SHOWING METAL CEILINGS.

ORIGIN AND DEVELOPMENT OF HARNESS.

There seems little doubt, says a writer in the New York *Evening Post*, that the first domesticity of the horse was not for purposes of equitation or work, but simply to obtain a supply of mares' milk, of which many Asiatic peoples are extremely fond today. The lasso, or lariat, was probably the first item of control—something that would effectively choke and restrain the animal—while the whip in its crudest form came as a modification of the war club. Bas-reliefs show that the Libyans guided their horses entirely by a light switch, even as the gooseherds of Rome guided their large flocks of geese by a limber wand, tipped by a strip of Tyrian purple.

As the domesticity of the horse progressed, and its working qualities were discovered, it was an easy step from the lasso to the hitch through the mouth which made the first rude halter, and accident would show that the control of the animal lay in the pressure on the tongue —not in the sides of the mouth, as so many riders appear to think today. The Libyan halters were made of rushes, plaited, and the Irish halters of the Middle Ages were of plaited straw.

For centuries the horse was driven and ridden without a bit, even as the high school riding master of today controls his horse by knee pressure and balance. Primitive bits brought by the Huns into Europe from Asia were of horn, bone and tempered bronze (of which all our modern wisdom can find no duplicate), a bronze which will take an edge like steel. Even in the earliest days the rigid bit was regarded as less effective than the flexible bit, like the modern snaffle and curb.

WITH THE MANUFACTURERS.

Industrial Notes of Interest—Descriptions of Products Which Find a Ready Market Abroad.

THE IMPORTANCE OF PROPER DESIGN IN ELECTRICAL METERS INTENDED FOR EXPORT SERVICE.

(WRITTEN FOR THE AMERICAN EXPORTER.)

By E. D. Mills and H. W. Young,
Of the Westinghouse Electric and Manufacturing Company.

In the development of large electrical apparatus for the generation, transmission and transformation of electrical energy in localities remote from the manufacturing base, great care has been exercised by designers to produce apparatus which will not only have a high efficiency but also have the very necessary characteristics of reliability, simplicity of construction and ease of repair or adjustment. It is noticeable, however, that many designers of the smaller apparatus, such as switchboards, meters and instruments, have apparently neglected some of these features, and it is difficult to comprehend this apparent oversight, as it is largely upon the accuracy and reliability of instruments and meters that the financial success or failure of the plant is dependent; for instance, if the switchboard instruments are inaccurate the system will be operating improperly and will give unsatisfactory service. If the consumer's meters are running fast a complaint or even loss of business will result; if the consumer's meters are running slow the central station is losing a greater or less percentage of its income. In other words, the last analysis of the financial success or failure of an electric lighting or power proposition largely centers about the accuracy of those devices by which the generated energy is measured or distributed.

In order that purchasers of electrical apparatus may have at least a general knowledge of the appearance, principle of operation and construction of a line of standard indicating and integrating meters manufactured for export by the Westinghouse plant, the following descriptions have been prepared: Fig. 1 illustrates a direct current ammeter, intended for the highest class switchboard service, an internal view being shown in Fig. 2. This meter is of the D'Arsonval Permanent Magnet Moving Coil type, employing a fixed magnet with pole pieces so arranged as to form a magnetic field, within the influence of which is pivoted a suitably designed coil. The meter depends for its action upon the fact that the magnetic field generated by the current passing through a pivoted coil is in opposed magnetic relation to the field generated by the permanent magnets, and according to the well-known law that two opposed magnetic fields tend to repel each other, the field of the pivoted coil tends to move it out of the permanent magnet field and produces a deflection of the indicating pointer. The coil movement is opposed by the restraining force of the controlling springs, which tend to return the indicating pointer to zero position, and the moving element thus takes up a position where the displacement is just sufficient to re-establish equilibrium. This relation affords a ready means of measuring current values in which the indicating pointer deflection is directly proportional to the current passing, and these values are read on a suitably graduated dial.

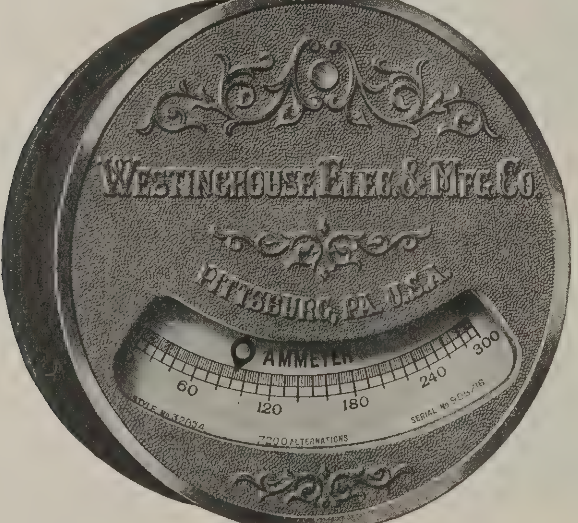


FIG. 1.

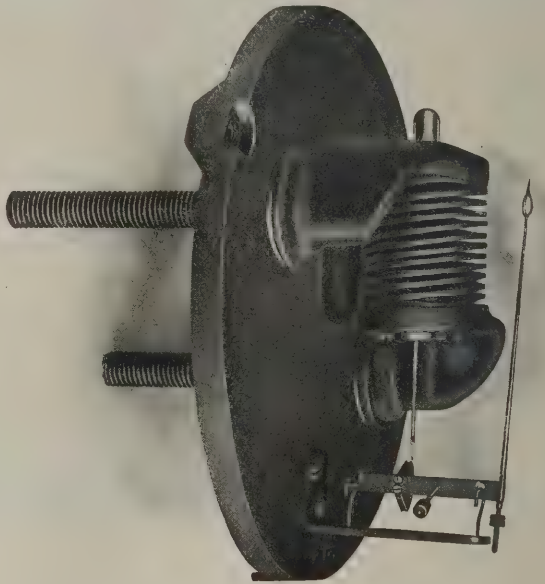


FIG. 2.

It will be noted that the magnet system is of a different construction than is found in the ordinary form of moving coil meter. As a rule this type of meter employs two air gaps in the magnetic circuit, thus increasing the liability of aging or change in the magnetic values and correspondingly affect the accuracy. In the magnetic system employed in this design there is but one air gap, and, furthermore, the pole pieces are fully assembled before the magnets are charged. By this arrangement a construction is secured which is much more permanent than can possibly be secured by any construction necessitating the assembling of pole pieces or setting of air gaps after the magnets have been charged and aged.

The design readily lends itself to construction for voltmeters by using fine wire windings on the pivoted coils in series with high resistances, or for ammeters, by using fewer turns of slightly heavier wire in series with a calibrating resistance and shunted across a known resistance such as offered by the usual shunt.

Many of the earliest forms of ammeters and voltmeters were constructed on the solenoid principle, depending for their action upon the pull of a soft iron core suspended within a solenoid and acting in opposition to the pull of gravity on counterbalancing weights. By means of an indicating pointer attached to the suspended element and a suitable scale a direct measure was secured of the current value producing the deflection.

The highest development of the solenoid principle is found in the Kelvin type of meters, a commercial form of which is shown in Figs. 3 and 4. Fig. 5 illustrates the arrangement of the various bearing and controlling parts. "F" is a supporting bracket attached to the meter base; "KK" phosphor bronze-bearing hooks shaped to knife edges at bearing points; "B" a hardened steel beam, drilled, countersunk and shaped to form knife-edge bearings resting on hooks "KK." This form of construction insures bearings having minimum friction, easily removed for inspection, not easily damaged and of long life.

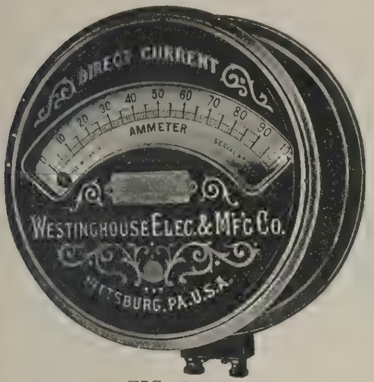


FIG. 3.

Fastened to "B" is a grooved pulley sector, "S," supporting a silk cord, to the lower end of which is suspended the iron wire core "R." The pointer "P," zero adjusting weights "E," and full scale adjusting weights "D," all rigidly attached to "B," complete the moving system.

Looking at the system from a mechanical point of view, it will be seen to comprise a lever arrangement in which a variable straight line pull of constant radius is opposed to a constant pull of variable leverage. The variable pull is that due to attraction of the wire by the magnetic field generated by current passing through the coil, for which pull sector "S" provides a constant leverage. The action of gravity on the controlling weights provides the constant opposed pull and movement of the weights, through a circular arc away from the vertical line of support, and gives to the opposed pull a variable leverage.

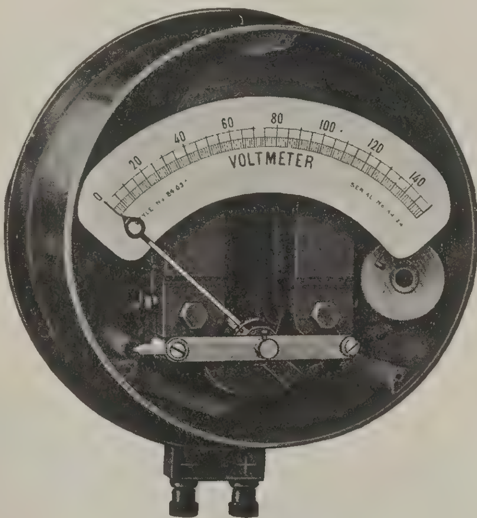


FIG. 4.

With no current flowing (pointer indicating zero) a condition of equilibrium exists, in which the centre of gravity of all that part of the moving system (except the armature) is displaced a sufficient amount to the right to counterbalance the iron wire. With current flowing through the coil a magnetic field is generated which, attracting the iron, exerts a pull on the system, causing the pointer to move to a position where the displacement is sufficient to re-establish equilibrium.

By the design outlined above a construction is secured which is not only accurate and permanent, but also moderate in price.

AWARD OF MERIT.

The twelfth award of merit for their manufactures has just come to Messrs. Brandram-Henderson, Limited, manufacturers of paints, varnishes and lead products, their exhibit having secured the Gold Medal at the Provincial Exhibition of Nova Scotia, held in Halifax this September and October. Other rewards of merit were awarded them at the Colonial and Indian Exhibition, London, 1886; Jamaica International Exhibition, Jamaica, 1891; Glasgow Exhibition, 1901 (diploma); Dominion of Canada Industrial Exhibition at Toronto, 1903; Dominion Exhibition at Halifax, 1906; and this is the sixth medal awarded them at the Nova Scotia Provincial Exhibition.

LAWN MOWERS.

The Philadelphia Lawn Mower Company, Philadelphia, Pa., has opened an office with Mr. H. E. Sturtevant, metropolitan agent, No. 18 Warren Street, New York City.

A full line of samples of this firm's manufacture will be shown, consisting of seventeen styles of hand mowers and several horse mowers, with lawn sweepers, grass collectors and lawn sprinklers, making a most complete line of lawn mowers from 6½ inch to 12 inch wheels, and from three to eight blades, which will be sold at manufacturers' prices.

This arrangement has been made to fill the want of the New York City trade, and will be greatly appreciated by the many patrons of this well-known manufacturing company.

AN ALLEN RIVETER TO CUBA.

John F. Allen, 370-372 Gerard avenue, New York City, has just shipped one of the firm's riveters of 66 inch reach for 1¼ inch rivets to the Ansonia Copper and Iron Works, Matanzas, Cuba.

PRESSES AND DIES.

The Ferracute Machine Company, of Bridgeton, N. J., manufacturers of presses and dies for sheet metals, are sending a number of presses to foreign countries and filling large orders from domestic consumers. They shipped in one week recently presses to England, India, Austria-Hungary and France, besides several carloads to points in this country.

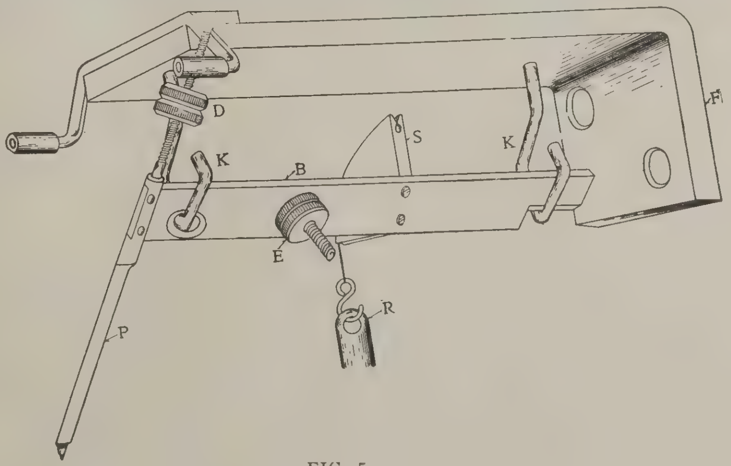


FIG. 5.

THE JONES AUTOMATIC SPEED CONTROL GOVERNOR.

A New Invention by Joseph W. Jones, the Inventor of the Jones Speedometer.

A new device which will control the speed of an automobile has just been placed before the automobile public. Joseph W. Jones, inventor of the pioneer automobile speed indicator, is responsible for the new device. It is used in connection with the speed indicator, and will be known as the Jones Automatic Speed Control Governor. Through its use the owner, the man in the tonneau, will have positive control of the car's speed. The simple operation of an electrical switch, which the owner may throw to ten miles contact, means that the car cannot exceed that speed.

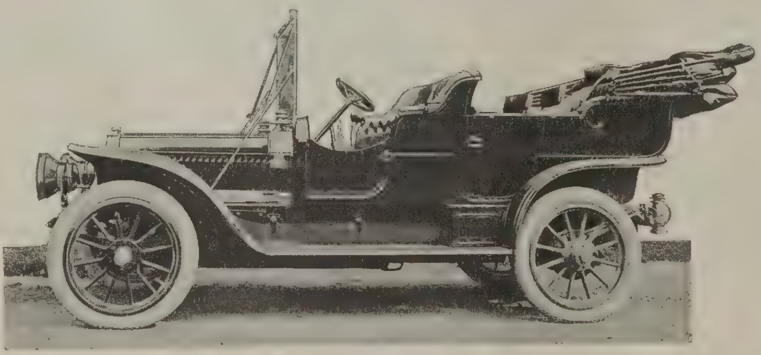
JONES SPEED CONTROL GOVERNOR.

Drivers with insane desires to "scorch" or hit it up at "66 per" through crowded thoroughfares will not necessarily be benefited by the new invention, but as this class is in the minority the chances are in favor of, rather than against, a law being passed compelling the manufacturer to include the Automatic Speed Control as "part equipment," or else compelling the owner to use this device at all times, the same as he is now compelled to light his lamps at night.

Owners of motor cars are more than frequently brought into court for exceeding the speed limit and made to suffer unnecessary expense and loss of time when the whole trouble is due to the chauffeur and not the owner.

In the future the chauffeur's only duty will be to steer the car, for the man in the tonneau will be in control. If he throws his switch to 10, immediately the car reaches that speed it will not go higher. Then if the owner wishes to go to 15 he throws his switch to that contact point, and so on up to maximum speed.

The new device is also applicable to a variety of uses. The illustration shows the application of this principle to governing the speed of an automobile, and so arranged that the occupant of the tonneau or limousine may control the speed at which the vehicle may be operated and thereby eliminate a great deal of the danger and uneasiness felt from reckless driving by the chauffeur. In fact this arrangement is of particular value to the chauffeur himself. If he is driving alone and wishes to relieve himself of the anxiety of watching the speed indicator constantly for the purpose of keeping his speed within the legal rate, thereby avoiding liability of arrest, before starting the car he can set the switch at 15 miles or 20 miles, and he knows there need be no fear of being arrested.



THE 1908 SIX-CYLINDER WINTON.

A man who drives a great deal finds that after running his machine constantly for an hour he unconsciously drives faster and faster. While fifteen or twenty miles may appear to be a comfortable speed when you start, after having driven for a distance it seems nothing less than a snail's pace, and you unconsciously drive the machine faster and faster. By the use of this new automatic speed control governor a man will now be able to tell precisely at what speed he is driving his car, not by guesswork but by science.

THE WINTON SIX-TEEN-SIX.

The Winton Motor Carriage Company, of Cleveland, is again a pioneer, being the only company in the world to produce six-cylinder cars exclusively. Since 1903 Mr. Winton has been concentrating his thought and effort upon the six-cylinder proposition, and his decision to make sixes only, coming as it does at the introduction of the Six-Teen-Six, bespeaks his confidence in this production. The Six-Teen-Six, so called because it is the sixteenth Winton model and has six cylinders, presents an unusually neat and compact power plant, practically every element being housed. The 4½x5 inch offset cylinders are cast in pairs, and are completely water-jacketed. Ignition is by Eisemann magneto, with storage battery as auxiliary source of current. Mechanical lubrication by means of the gear-driven Hancock oiler of twelve leads is provided, a filtering system being connected therewith to prevent waste of lubricating oil. The carburetor is of Winton design, and carries a puddle of gasoline in the air inlet, whereby its efficiency at low speed is assured. Two throttles working together automatically govern the air supply to meet the motor's varying requirements. Transmission is of the selective type of sliding gear, with three forward speeds and reverse, the top speed being direct. The multiple disc clutch, housed in the forward end of the transmission case, is particularly compact, and, as before, carries six springs, placed equidistant around the clutch, to distribute tension equally upon the discs. The body is supported on Winton twin springs, such as have characterized Winton cars for several years.

To overcome the one bugbear of the six-cylinder, i. e., the labor of cranking, the Six-Teen-Six is equipped with an ingenious self-starting device. Compressed air, supplied by the motor, is stored in a supply tank. When ready to start the motor a valve on the dash is opened, and air rushes into the cylinder ready to fire and forces the piston past the firing point, where combustion puts the motor into operation.

Tires are 36x4½ inches all around. The wheel base measures 120 inches.

Four different bodies are designed to fit the Six-Teen-Six chassis, these being seven-passenger touring car, limousine and landaulet, and three-passenger runabout. In design all these bodies are distinctive, and reflect credit on the makers.

1908 REOS.

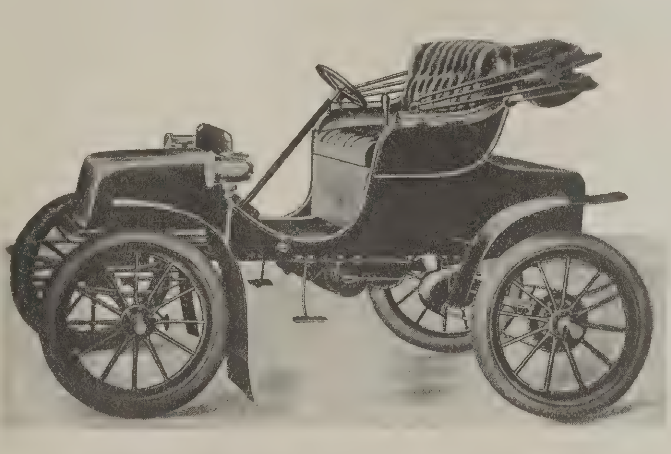
In holding back the details of its new models for 1908 until just preliminary to the opening of the New York show season, it is evident from a perusal of the specifications of the new cars, as well as from their greatly improved appearance, that the builders of the Reo have been actuated by motives other than secrecy, says C. B. Hayward, the noted expert and engineering editor. They have had a great deal to uncover, for the new Reos represent a fitting advance over their predecessors in many ways.

BABCOCK ELECTRIC CARRIAGE COMPANY'S EXHIBIT.

The Babcock Electric Carriage Company exhibited at the show in Madison Square Garden four models—Models 1 Special, 5, 6 and 10. In the last three named there are some features not previously shown.

This change is in the controller and method of operation. In Models 5, 6 and 10 the speed is controlled almost entirely by means of a foot lever. There are five speeds forward and two reverse. After the controller handle has been placced at the desired speed it is not necessary to again touch the handle, unless the rate of speed is changed. Once under way the car can be slowed down, allowed to coast, or the countershaft brake applied and the car brought to a stop, all with one movement of the foot lever. There are besides a foot lever operating brakes that act on the rear wheels. This method of control makes the operation of these models extremely simple and reduces to a minimum the amount of power lost while changing speed.

Model 5 is a roadster, intended for long distance. Its makers claim for it the highest speed and greatest mileage capacity of any electric automobile on the market. The range of speed is from 6 to 26 miles an hour. On the third notch (16 miles per hour) 85 miles can be obtained on a single charge if properly operated. It was this model that made the record-breaking run from New York to Philadelphia. This model weighs about 1,600 pounds, has a 78-inch wheel base, 32-inch wheels equipped with 3½-inch pneumatic tires. The power is obtained from a 36-cell battery, made by the Babcock Company, distributed half in front under the hood and half in rear of body, and the motor is suspended from the chassis under the seat. It has a double chain drive of the latest improved type. The price of this car is $1,500.



THE BABCOCK ELECTRIC CARRIAGE.

Model 6, the victoria phaeton, is a strikingly handsome vehicle and is particularly adapted for use by women. It is hung low and has continuous mud guards, which make it impossible for the garments of the occupants to get soiled. It is very roomy but very light in appearance; is capable of high speed and great mileage. It weighs about 1,700 pounds, the wheel base, wheels and motor being the same as on Model 5. It is equipped with specially constructed 3½-inch double tube tires. The battery in this model also consists of 36 cells, half in front under the hood and half in rear of the body. The upholstering is of the finest quality of broadcloth. The price of this car is $1,700.

Model 10 is a coupé, and it is one of the handsomest and at the same time lightest in weight vehicles of that kind ever built. The finish and appointments are of the highest order. It has a very roomy seat and all the windows can be dropped, thereby making a comfortable vehicle for warm weather. A special arrangement of the steering wheel makes it possible for the operator to enter from either side. It is claimed by the builders that because of its light weight it has greater mileage and speed than any other coupé. The chassis is the same as that of Model 6, and the body is so arranged that it can be removed and the Model 6 victoria body put on in its place in less than an hour. The price of this car is $2,100.

Model 1 Special is a handsome, stylish vehicle of the stanhope type, intended for very large people. This car hangs low and also has continuous mud guards. It has a wheel steer with tilting mast, making ingress and egress extremely easy. It has a 66-inch wheel base, wheels being 32 inches front, 36 inches rear.

THE WHITE STEAM CAR.

For the coming season of 1908 the White Company offers two distinct models—a 30 horse-power car, known as the Model K, and a 20 horse-power car, known as the Model L. These new models are the successors respectively of the Model G and the Model H of the present season, and the prices for each model, with the various styles of body, are unchanged.

Changes from last year's design in the 30 horse-power car are few, because few were necessary. It was not deemed necessary to make any increase in power, a sthe Model G was sufficiently powerful to climb the Wilkes-Barre Mountain 15 per cent. faster than the most powerful gasoline car. Nor was it necessary to radically redesign a car which made a perfect team score in the Glidden Tour and which, on top of that, won the Hower Trophy and incidentally established a new record of 2,080 miles for a faultless touring performance. It was believed also that a car which could show a mile in 1:02 and 25 miles in 29:07, as did the White stock car in the Santa Rosa races on July 4, was fast enough for any ordinary requirements.

"The horse power rating of our cars is not fanciful or theoretical," says the White Company, "but is based on the horse power that the whole car delivers. This is shown on our testing plant, for not only the engine but the amount of power delivered the rear wheels is tested, and our cars rated accordingly. This was even more strikingly demonstrated in our winning the Yellow Trophy in the greatest hill climb of the year in England, where the award was made from careful computation of the horse power developed in going up the hill."

The company is using the same type of compound marine engine with two cylinders that it has used for a number of years. This engine has demonstrated its perfect adaptability to automobile work; its smooth running and great power in starting and at all speeds make it an ideal engine, especially when its light weight and lack of complication are compared with the heavy weight, large number of cylinders and consequent complication of the gasoline engines that are now being built, in an endeavor to approach the easy running and easy control of the steam engine.

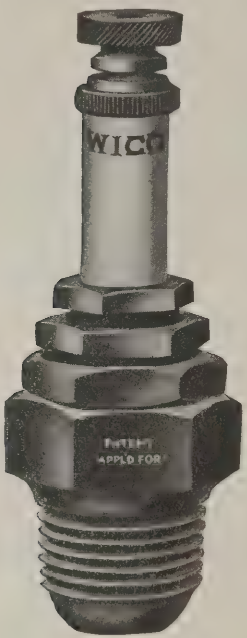
One noticeable change in the 30 horse-power car is the lowering of the engine and generator and the lowering of the frame, making it 1½ inches nearer the ground. This change has been effected without altering the liberal clearance of the car.

As regards the body design, the touring car offers a straight line body, in addition to its characteristic curved line body. Either of these bodies seats seven persons comfortably. The wheel base of the touring car has been lengthened to 122 inches and the rear springs have been lengthened to 54 inches. The wheel base for limousines and landaulets is 115 inches, the same as in the Model G. The wheel base of the runabout is 104 inches, the same as in the G runabout which won the Hower Trophy.

There are two marked changes in the Model L as compared with the Model H. The generator tubing in the new car is of one-half inch internal diameter, instead of three-eighths inch, which, without other change in generator dimensions, gives an increase in capacity. The engine in the Model L is supported on an aluminum pan, doing away with the channel iron supports, increasing the accessibility of all parts and giving perfect protection from mud and dust.

A PERFECTED SPARK PLUG.

The Witherbee Igniter Company showed in the New York exhibit a number of novel utilities designed by W. W. Robinson, its mechanical engineer, which are being marketed under the trade name "Wico." One of these, a micrometer-adjusting spark plug, possesses the distinct advantage of being easily adjusted to any spark gap, to adapt it to any compression or any system of ignition, either coil or magneto, and at the same time can be taken apart for cleaning without in any way disturbing the packing. A neat, substantial Mission oak, brass trimmed case, holding either five or seven plugs, found immediate favor with the motorists.



The Wico timer embodies an entirely new departure in the roller type of timer, a loose ring providing at all times a perfectly smooth path of the roller and exposing a constantly changing surface to the break of the contact, to eliminate wear. This new timer operates with metal to metal without noise; is extremely compact, and provides a direct ground for each contact of about ⅜ of an inch, thus reducing the current consumption to a minimum hitherto unattained.

The Wico trouble lamp is an exceedingly compact little affair, with a neat brass wire lamp guard, brass handle and a generous length of silk coil, all neatly boxed to occupy a small space.

Wico plug switches, single and in gangs up to four, for lighting of tail lamps, gauge lights, side lights, dome lights, etc., removable, working on the "touch the button" principle. The Wico three-way switch for sparking circuits presents a new form of plug switch which is self indicating; one can tell which battery is on by noting the position of the plug. This switch turns on either one of the two batteries or both together, or, with handle, a battery and generator or magneto. An entirely original feature of this line of switches, which appeals strongly to the layman, is that they can be wired up to the job and the cover or switch proper put in place, thus eliminating the usual annoyance of trying to make a wire fast to a screw down in a hole.

Modern types of electric lamps for speedometers, clocks, oilers, tool boxes, under the bonnet, etc., are included in the Wico line of things electrical for the automobile brought out by the Witherbee Igniter Company.

Wico spark coils, products of the Witherbee Igniter Company, have a clean-out, well-made look that insures their favor with the autoist. They literally bristle with new up-to-date features, which seem admirably well suited to the necessities of easy adjustment, accessibility and compactness. One simply wonders why they haven't been thought of before. The Wico coil case is a revelation of what accessibility means; the removal of a coil section, the attaching of the wires and switches brought forth many laudatory comments from factory engineers, garage men and prominent autoists whenever shown.

The Witherbee Igniter Company's exhibit attracted unusual attention, not only from dealers and car manufacturers, but from the general public, which evinced a genuine scientific interest in the company's modern accessories.

THE AUSTIN AUTOMOBILE.

The Austin Automobile Company, Grand Rapids, Mich., after six years' experience in the manufacture of high power touring cars, now offer their Model XC-T.

This is a 90 horse-power car, having six cylinders with 5½-inch bore and stroke, and is unequaled for its smooth, easy action at any speed, over any kind of road. The wonderful power of this car is not only desirable on account of its great speed, but particularly so for the easy manner in which the driver can go at any speed which he may desire without excessive strain on the engine or mechanism in any way, and still have that surplus of power for sudden emergencies which will be so fully appreciated by all drivers who wish to own the very best.

Their six cylinder roadster Model XC-R has practically the same chassis as the touring car, and is furnished with their new combination body, which can be used as a six-passenger, side-door touring car, or quickly changed to a four-passenger runabout (with a rumble seat) of the very latest design, being also equipped with an additional folding, revolving chauffeur's seat.

This new combination body will be furnished on either the 60 horse power or 90 horse power chassis. It is one of their special 1908 features, which is sure to become very popular, as it is furnished with the full extension top for the touring car and a single top for the runabout, making two complete cars of the very latest and most approved design for the price of one.

Their detachable limousine tops are furnished with either the 60 horse power or 90 horse power touring cars. They have proved very satisfactory during the past year, and will be continued as a special feature of their 1908 models. They are most complete and perfect in every way, and are a most desirable feature, as the car can be changed from a complete limousine into a touring car with a full extension top (which is furnished with all detachable top limousine).

Another feature of these cars to which they wish to call especial attention is the fact that they build more of the complete car in their own factories than any other manufacturer in the United States, which enables them to be more certain of the perfection of all material and workmanship than can possibly be secured in any other way, and also to furnish their customers with duplicate parts of all "Austin" cars, be they five, ten or twenty years old.

A valuable feature of all cars for the past five years is the control of the torsion on the rear axle by very long, flexible springs, which greatly lessen any sudden shock or jar on the driving and transmission gears, and materially increases the life and durability of the tires. Austin cars have always been most exceptional for their ease on tires, twelve thousand miles on one set being a most remarkable average.

The Austin motor is a six cylinder, high compression engine of 5½-inch bore and stroke. The inlet valves are directly over the exhaust valves and seated in a detachable cage, making both valves very quickly and easily removable. The lifting rods of both valves are adjustable so that any wear or lost motion can be easily taken up.

The new aluminum base has an oil-tight case completely enclosing all gears, which run in a bath of heavy transmission oil, entirely separate from the light gas engine oil used in the base. This is a new and improved feature not found on any other engine.

The crank shaft has seven main bearings, 2 inches in diameter, all 3 inches long except at the flywheel, which is 4 inches. The crank pins are 1¾ inches in diameter and 2¾ inches long. Especial attention is called to the number of main crank shaft bearings in this engine, a most desirable feature on a four cylinder, and especially so on a six cylinder car.

WHAT THE RAPID IS DOING.

The Rapid Motor Vehicle Company's exhibit at the New York Show formed one of the greatest and most complete ever given by any commercial car manufacturer. Ten entirely different models were presented, covering delivery wagons, trucks, sightseeing cars, opera buses, wagonettes, police patrols and telephone company emergency cars. This list comprises only a part of the Rapid Company's product, but it had a collection of photographs and specifications of the other models in actual service.

RAPID TRUCK.

The 1908 Rapid chassis is a good example of "foolproof" mechanism, something that is even more essential in a commercial vehicle than in its more carefully tended relative, the pleasure car. The 30 horse-power motor is a double opposed, four-cycle type of original Rapid design, and is forced water cooled. Access to all engine parts, cylinder contents, etc., is obtained by simply raising crank case cover, which operation also permits all valves and valve cases to be removed by unscrewing one nut on each. The crank shaft is chrome nickel steel, running on wide bronze bearings. Roller bearings are used in wheels and jack shaft, since their dependability in commercial car service is greater than any other type. Every part of the entire Rapid chassis, with the exception of tires, roller bearings, carburetor, chains and accessories of that character, is made from raw material on jigs and templates in the Rapid factory, which permits a most thorough inspection of both material and every stage of the car's construction. The transmission is of the well-known planetary type, altered sufficiently to conform with the Rapid policy of ample strength in every part. The gears are of an eight to ten pitch with a 1¼ inch surface, which is sufficient for a chassis of twice the capacity. The transmission is so situated beside the engine in the center of the frame that the weight is evenly distributed. This permits all vital parts to get the fullest benefit from the springs in lessening vibration on rough roads. Pistons and all friction bearings are constantly lubricated by a positively driven oiler, the amount necessary for each determining the supply. A double side roller chain drive is used, the differential being in the jack shaft. The smooth running resulting from the sprockets being made in pairs and on a gear shaper fully justifies the extra work. The tires are solid endless rubber, 3½ inches in width. The two speeds, forward and reverse, are controlled by two foot pedals and one high speed lever, which also supplies the internal hub brakes with the one movement.

The Rapid Company operates its own body plant, performing every operation from seasoning the timber to applying the fifteen to twenty coats of paint and varnish on every car. A complete woodworking building, recently erected, has facilities for constructing any design of body desired for any service.

The Rapid product is replacing the horse-drawn vehicles in every line of business using wagons and trucks, besides operating successfully in business resulting from the creation of the commercial car.

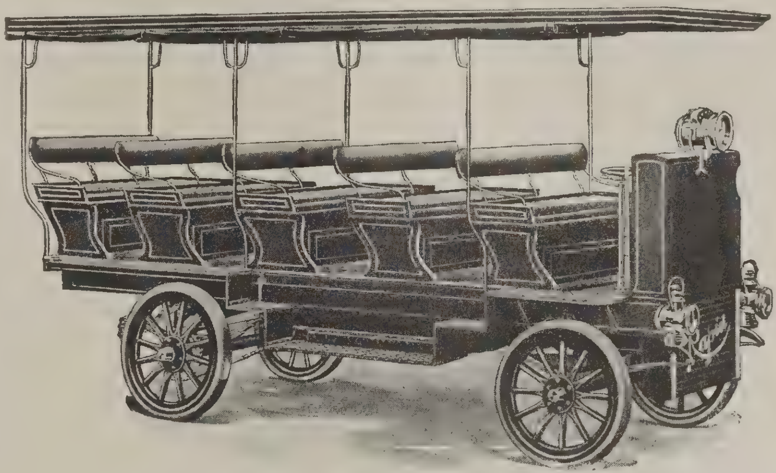
At its exhibit the Rapid Company had complete data at hand showing just what saving the use of the car represents; also letters from users, attesting to the truth of the statements made of the savings.

The Rapid Motor Vehicle Company is now enjoying the most successful year it has had, and the fame of the Rapid vehicles and trucks has grown so well that an assured position has been secured.

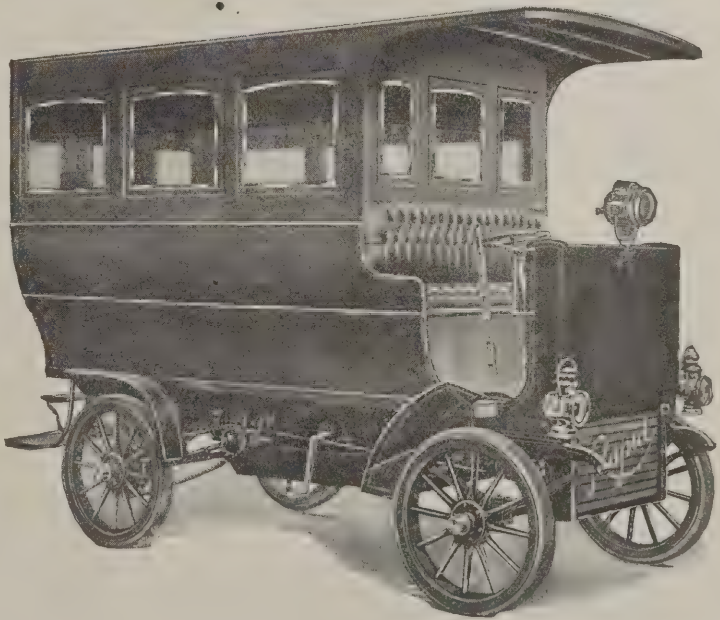
The exhibit of the company at the New York Show was a center of great interest, for the commercial use and value of the automobile was a subject made more prominent at this show than ever before.

DESK LAMPS.

McLeod, Ward & Co., 27 Thames street, New York, report large sales of their famous Kinsman electric desk damp, a very popular lamp, which is an unusually effective eye protector.



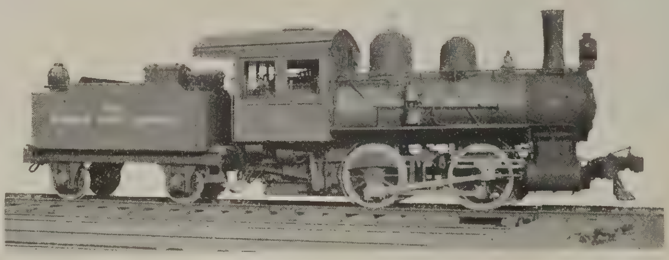
SIGHTSEEING CAR.



CLOSED CAR.

SWITCHING LOCOMOTIVES.

The accompanying half-tone cut shows the general appearance and design of a four-wheel switching locomotive with four-wheel tender recently built by the American Locomotive Company for the Burden Iron Company. This engine is intended for switching service in the yards of the above-mentioned manufacturing company, and represents the builders' standard 16x24 inch cylinder, four-wheel locomotive, with separate tender. Within the past few years the American Locomotive Company has been standardizing its small locomotive designs, and, as will be seen from a careful study of the side elevation of the engine illustrated, this design has been particularly well worked out for the service for which the engine is intended, and is an excellent one for service where light rails, poor roadbed and short curves are the conditions to be met.



SWITCHING LOCOMOTIVE.

The general dimensions of the locomotive are given below: The cylinders are 16 inches in diameter by 24 inches stroke, and are actuated by Richardson balanced slide valves. The total weight in working order, all of which is of course on the driving-wheels, is 85,000 pounds. With a boiler pressure of 180 pounds and driving-wheels 50 inches in diameter, this engine has a maximum tractive power of 18,800 pounds, which, using the usual figures for resistance on the level and 20 pounds per ton for 1 per cent. of grade for grade resistance, gives this engine a net hauling capacity, exclusive of locomotive and tender, on a 1 per cent. grade of 640 tons, and on a 2 per cent. grade of 330 tons. With 18,800 pounds of tractive power it will be noticed that the weight on drivers gives a factor of adhesion of 4.52, which is an excellent figure for an engine of this type designed for switching or industrial purposes. With a wheel base of 84 inches this engine will easily negotiate a curve of 65 feet radius.

A careful study of the principal dimensions given below will show that particular attention has been paid in the design in securing the proper ratios between heating surface and grate area and heating surface and cylinder volume. With 85,000 pounds on drivers, the engine has a load per wheel of 21,250 pounds, which can easily be carried on a 60-pound rail. In this design the tender, which is of the "U"-shape flat top type, has a water capacity of 2,500 gallons of water, and fuel capacity of 3 tons of coal. The tender frame is built of steel channels, as will be seen from the drawing.

A wood-burning stack could be easily applied to this engine, and would make the design (with weight all carried on drivers, large factor of adhesion, short driving-wheel base and ample water and fuel carrying capacity) very well adapted for logging service.

THE SYRACUSE ENGINE.

An active campaign for foreign trade is being pushed by the Syracuse Gas Engine Company, of Syracuse, N. Y. In presenting the 1907 model of "The Syracuse" engine this company offers the logical result of many years of practical experience in designing, building and running marine motors and has retained only the features of proven worth and reliability tried out in active service.

Cylinders are cast from the best close grained iron and are of novel construction in that they embrace at once the features of both the solid and detachable head. The explosion chamber has a solid head requiring no packing and consequently eliminating all trouble experienced with detachable heads.

The outer or water jacket head is detachable, thus allowing full and free access to the water jacket for cleaning out sediment or lime likely to be deposited when running in foul or extremely hard waters, and therefore removes the only practical argument in favor of a detachable head and retains every good feature of solid construction.

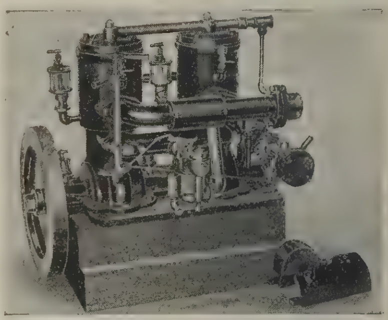
Crank shafts are forged from solid billets of the toughest steel and are of large diameter and long bearings running in genuine hard babbitt, thus reducing friction to a minimum and standing up under the greatest amount of abuse.

Connecting rods are made of the best phosphor bronze, of tubular construction, serving the double purpose of maximum strength for given weight, while reducing the area in the crank base, and at the same time conducting oil to the crank shaft.

The engine is of the two-stroke, three-port type in which each piston gives an impulse to the crank shaft at every revolution, the advantage of which as a power producer over the four-cycle, which has a working stroke every other revolution only, is readily seen. The ports are of extreme radial length, thus allowing a minimum height without cutting down area required for high speeds and also increasing the available working travel of piston.

In "The Syracuse" this valve, as well as all others, has been discarded and the supply of gas from the carburetor to the crank base is regulated by the port over which the piston travels, thus opening and closing the supply passages at just the right instant, never earlier, never later, and always on time.

As the efficiency of the engine depends absolutely on the proper fitting and correct design of the piston and rings, great care is exercised on these parts.



SYRACUSE MARINE ENGINE.

The pistons are larger than commonly used, fitted with three rings at the top and oil groove at the bottom, and bored for the wrist pin in a jig that insures perfect alignment. The wrist pin is so fastened in piston that it is impossible to work endways and score the cylinder as is sometimes the case with the usual method of using set screws which work out, thus ruining the cylinder.

Water circulation is obtained by gear pump constructed of bronze throughout, furnishing a steady, positive supply of water.

Lubrication of cylinder, crank and wrist pin is obtained by the use of one oiler only to each cylinder. The wrist pin is of large size and hollow construction; and is a positive feed, oil tube direct from the lubricator through the wrist pin and connecting rod to the crank shaft, thus giving positive lubrication to the most important wearing point.

ENLARGED FACTORY.

The Bristol Company, of Waterbury, Conn., the well-known manufacturers of Bristol recording instruments, Bristol steel lacing and other specialties, is about to erect another new addition to its present plant. This addition will be 53x170 feet, and will be three stories in height. This additional space is made necessary by the demand for Bristol recorders and Bristol patent steel belt lacing.

DOWN FEED ATTACHMENT.

A patent was granted August 27, 1907, on the Down Feed Attachment as hereinafter illustrated and described. This attachment is applied to all Stockbridge Shapers made by the Stockbridge Machine Company, Worcester, Mass., and is an improved method of imparting a downward feed to the cutting tool. As its operation is automatic the possibilities and economy in the operation of shaper over hand feeding are not only in the saving of operator's time—he can be doing something else—but the feed being absolutely uniform is up to the full capacity of the tool with each stroke, which is impossible with hand feeding.

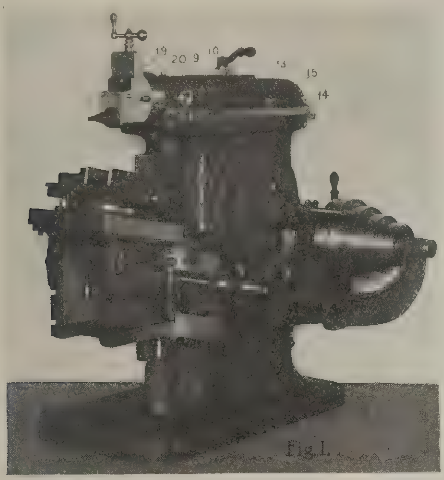


FIG. 1.

The downward feeding motion is imparted to the tool carrying sliding head 19 during the operation of the machine by an intermittent rotation of screw 4, which is actuated by means of miter gears 5, intermediate shaft 6 and gear 7 from a short shaft, 8, which receives an intermittent motion through mechanism supported by a plate, 9, which is removably attached to the side of the ram, said plate and mechanism being shown in Fig. 2.

Journaled to the plate 9 is an oscillating shaft, 10, carrying on its outer end an arm, 11, having its free end 12 arranged to be brought into contact with the dog 13, supported on a plate, 14, which is adjustably attached by a bolt to the fixed framework of the machine whereby a rocking motion is given to the shaft 10.

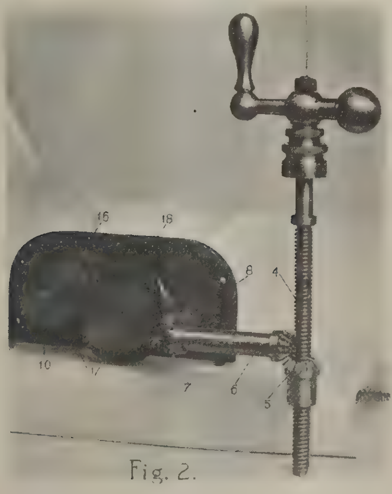


FIG. 2

The boss 16 is tubular and encloses a coiled flat spring, having one end attached to the shaft 10 and its opposite end to the tubular boss 16, so that the tension of the coiled spring will be applied to resist the swinging movement of the arm 11 as it is brought into contact with the dog 13 on the backward movement of the ram, and serves to return the arm 11 to its normal position as the ram moves forward.

The gear 17, through the chain of gears, communicates the motion given to it by the rocking of shaft 10 to the screw 4, which feeds the slide 19. The feed is on the return stroke, and is made positive by a pawl acting on the annular gear 18 provided with internal ratchet teeth adapted to be engaged by the pawl when the ram is on the return stroke, but slips on the forward stroke to allow rocker arm 11 to be brought back to the normal position by the coiled spring.

The dog 13 is pivoted in slide 14, and has a coiled spring attached to it on the back side, which holds it in the position shown. But should this slide be pushed too far forward, causing swinging arm 11 on the return stroke of ram to pass over dog 13, then on the swinging arm coming in contact with the dog on the forward stroke of ram the dog swings forward, allowing the arm to pass by.

The feed may be thrown out entirely by knob 20.

The down feed is absolutely "fool proof" and positive in its action, simple and compact in construction, and makes a valuable adjunct to the shaper.

PAINTS AND COMPOUNDS.

The use of copper paint has clearly brought forward the economic value of the material when put on the bottoms of wooden vessels. The firm of Tarr & Wonson, Limited, Gloucester, Mass., has received eight highest award medals in gold, silver and bronze for making this product. The paint prevents the boring of worms and the growth of barnacles and grasses. Racing compound is another article for protecting wooden bottoms, especially of yachts, where it is desired to secure the smoothest sailing surface obtainable. It also preserves the wood and prevents worms boring and all marine growths. It received the prize medal at the Antwerp Exhibition. Laczone is yet another protector of ship bottoms, but for those that are made of iron and steel. No copper is employed in the manufacture of this beautiful red priming and finishing coater. It reduces friction, fixes an exceptionally smooth surface, and is a great speed increaser. The above named indispensable articles are all that is claimed of them when the users practice exactitude in following the rules laid down by the company. Metallic or copper paint has been in use over forty-four years, and in many parts of the country it is the standard. At the Marine Railway and Ship Yard, Charleston, S. C., it is considered the best material for protection against worms, and is put on many of the boats. In Mobile Bay and Mississippi Sound, which are called "the home of the worms," the racing compound has been generally tested, with excellent results. A boat can run for twelve months in those waters, and at the end of that time come out perfectly clean, the bottom unimpaired. At Galveston, Tex., nearly every tugboat, pilot boat and quarantine boat has used Laczone since its manufacture. These examples of the employment of the firm's output attest the high esteem in which they are held in Southern districts, where conditions require extra protective qualities for ships, boats and yachts. It should be considered that, besides the preservation of bottoms, time and labor are saved by keeping craft in "the sailing habit." We believe these features should perpetually attract the attention of carriers in harbor or deep-sea trade, and if foreign or domestic owners will communicate with the company that makes the compounds mentioned, they will gain much additional information.

ENGINEERING NOTE.

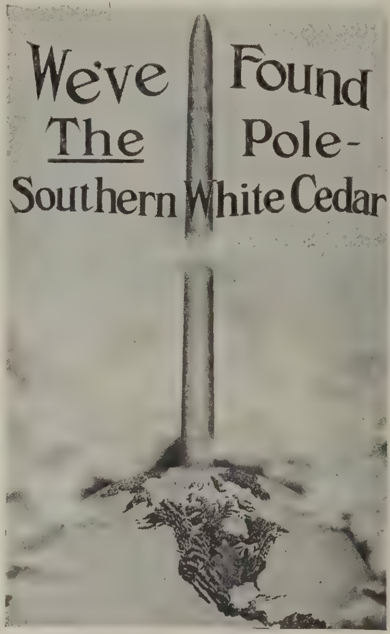
S. T. DeLaMater, engineer, formerly with the Standard Construction Company, of Chicago, has been engaged by the General Fireproofing Company, and for the present is located at the home office in Youngstown, Ohio. Mr. DeLaMater is graduate of Cornell University, and through his connection with a large number of contracting firms has acquired a wide experience in reinforced concrete design and construction.

A SUCCESSFUL POLE, CROSSARM AND TIE COMPANY.

The Southern Exchange Company of New York, sales office No. 97 Warren street, with mills in Georgia and North Carolina, and composed of the following members: President, E. G. Chamberlin, New York; vice-president and treasurer, A. J. McKinnon, Maxton, N. C.; secretary, R. M. Williams, Maxton, N. C.; sales manager, Walter E. Mitchell, New York, has experienced unusual growth and prosperity, which is due in a large measure to the company handling only high class material, thereby being able to control the best trade, who realize the economy of using only the best quality of material for their construction work.

The company is furnishing material to the principal companies throughout the country, and many abroad, among which are the following: Potosina Electric Company, San Luis Potosi, Mex.; Cordoba Light and Power Company, Buenos Aires, Argentine; Sao Paulo Tramway, Light and Power Company, Brazil; Cia. de Luz y Fuerza Electricas, Aguascalientes, Mex.; Cerre de Pasco Mining Company, Peru; Port Arthur Water Company, Port Arthur, Tex.; Union Springs Light and Power Company, Union Springs, Ala.; Edison Electric Illuminating Company, Brooklyn, N. Y.; New York Edison Company, New York City; Boston Gas and Electric Company, Boston, Mass.; Philadelphia Electric Company, Philadelphia, Pa.; Public Service Corporation, Newark, N. J.; Syracuse Rapid Transit Railway Company, Syracuse, N. Y.; Southern Power Company, Charlotte, N. C.; Norfolk and Southern Electric Railway Company, Norfolk, Va.; Westchester Lighting Company, Mt. Vernon, N. Y.; Union Gas and Electric Company, Cincinnati, Ohio; United Gas and Improvement Company, Philadelphia, Pa.; Worcester Consolidated Street Railway Company, Worcester, Mass.; Consolidated Lighting Company, Montpelier, Vt.; Tonawanda Power Company, Tonawanda, N. Y.; International Railway Company, Buffalo, N. Y.

The company makes a specialty of Southern white cedar (or juniper) round poles, which are especially adapted for overhead construction work, on account of their natural symmetrical appearance and durability; sawed yellow pine octagonal and square poles, untreated or creosoted, particularly adapted for city or town work; especially high grade long leaf yellow pine crossarms, untreated or creosoted; yellow pine railroad cross-ties.



ATTRACTIVE TRADEMARK.

NEW PORTABLE DRILLING RIG.

The National Supply Company, of Pittsburgh, Pa., is now for the first time offering to the export trade its new National Portable Drilling Rig. This rig fills a long-felt want, combining as it does the strength and stability of the old standard rig or derrick, used in the United States since the beginning of deep well drilling, with the lightness and portability of the machines mounted on wheels used for drilling shallow wells. It was designed and patented by a practical driller, and has been thoroughly tried out in the domestic work before being offered to the export trade. The fact that it has been necessary to enlarge the factory in order to turn these rigs out fast enough, although they have only been on the market a year, shows how successful they have proved.

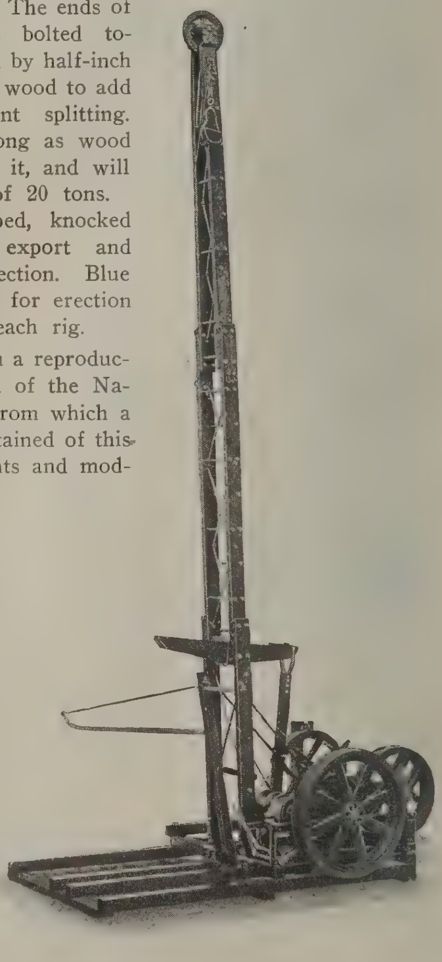
The rig is suitable for drilling wells 1,500 feet to 2,000 feet deep, and is furnished exactly as shown in the cut, consisting of the necessary timbers for sills, mast, complete with crown and sand pulleys, steel frame, band wheel, bull wheel for the drilling cable, and sand reel for bailer or sand pump line. It embraces several new features not found on any other rig. The walking beam is suspended between the two legs of the derrick, thus doing away with the sampson post, and is hung by means of new-style centre irons from the top instead of the bottom of the beam. This insures a secure position for the beam, reduces to a minimum the lateral motion or "whip" of the cable, and makes the working parts more compact. The ground space occupied by the National Rig is considerably less than with any other for similar service, the outside dimensions of the floor timbers being 14x26 feet.

The frame of the rig is built of structural steel, than which there is nothing stronger, and the band wheel shaft, sand reel and one side of the bull wheel are carried on this frame. The band wheel shaft is 4¾ inches diameter, with steel crank and flanges, and is mounted in boxes made of steel castings. The band wheel is 9 feet in diameter with 12-inch face, the bull wheel 7 feet in diameter, with a 16-inch by 12-foot shaft, and the sand wheel, which is iron, has a 14-inch face; capacity, 2,500 feet of half-inch wire line.

The mast is 60 feet high, 39 inches wide at the base, and is made in three sections, which are bolted together. It is made of Georgia yellow pine, 5¼x14 inches at base and 4¼x14 inches at top, and is well trussed the entire length with 1 and 2 inch pipe braces, with bolts passing through as horizontal braces. The ends of the sections, where bolted together, are reinforced by half-inch iron imbedded in the wood to add strength and prevent splitting. This mast is as strong as wood and iron can make it, and will withstand a strain of 20 tons.

The rig is shipped, knocked down, boxed for export and framed ready for erection. Blue prints and directions for erection are furnished with each rig.

Herewith is shown a reproduction of a photograph of the National Drilling Rig, from which a good idea may be obtained of this outfit's excellent points and modern construction.

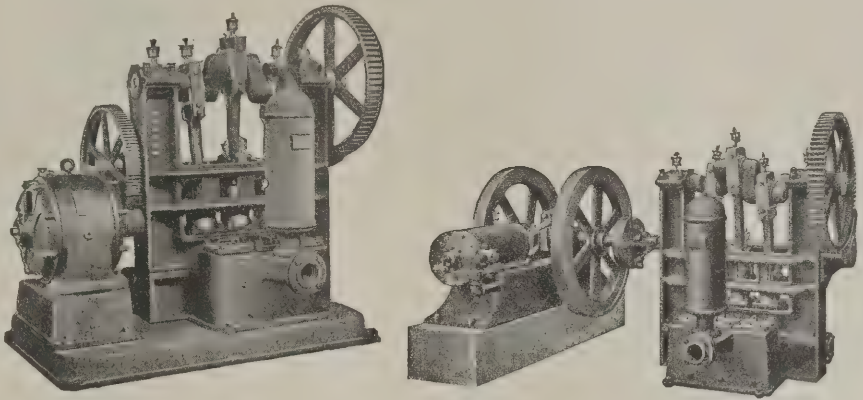


PORTABLE DRILLING RIG.

POWER PUMP FOR GENERAL WATER SUPPLY.

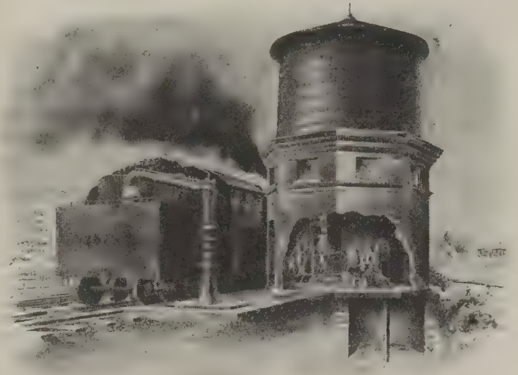
The problem of economical pumping is one of great interest to all industrial arts, affecting as it does in many factories and buildings their capacity and operating expenses as well as their yearly profit and loss.

To perform the work of pumping one may command motive energy in the form of water, steam, gas, gasoline or electricity, and the method of application of these forces makes the efficiency of the pumping system. Illustrations are shown herewith of two forms of power pumps direct connected to electric motor and engine. The uses to which they are put are varied and include all purposes for which any other style of pump has been or may be profitably employed.



GOULD PUMPS.

The pumps shown are compact and simple in construction. In operating expenses they possess distinct advantages over any other in point of economy. The power expended in operating them is obtained at the same cost as that required by the machinery in the mill, factory, plant or building. The construction of the pump consists of three cylinders, either single or double acting. In each cylinder plungers or pistons operate. The plungers or pistons are actuated by cranks on the crank shafts, placed 120 degrees apart, or one crank for each third of a circle of revolution. Thus each cylinder is in constant operation, evenly distributing the load, utilizing all power exerted on the crank shaft and maintaining a continuous flow of the liquid.



IN RAILWAY USE.

The duties of these pumps, as stated above, are varied and include every service. For general water supply in the modern skyscraper and for furnishing sufficient water under suitable pressure for drinking and other purposes, the triplex power pump has been adopted in thousands of instances. The architects and engineers no longer wrestle with the question of necessary space for boilers of suitable capacity to supply steam pumps. The power pump deriving its power, either direct from an engine or electric motor, requires so little power that the steam consumption of the engine is greatly reduced. The design of these pumps is also such that the floor space required is exceedingly small in proportion to the capacity of the pump.

The capacity of the pump and its uniform operation, as described above, make it perfectly desirable for tank pumping or direct pumping to house service pipes. The many advantages of the triplex pump for the above services have resulted in their almost universal use in the modern building manufacturing plants, mills, factories, bleacheries, dyehouses, etc.

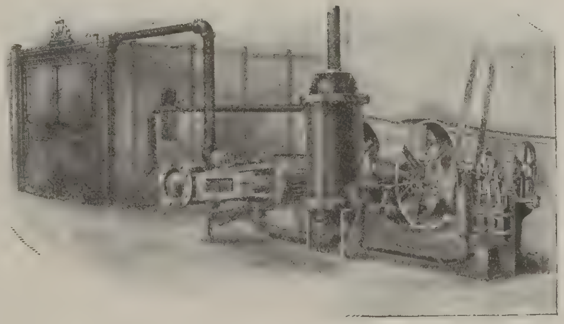
Among the other uses for which the power pump has been largely adopted might be mentioned boiler feeding and railway tanks. The advantages derived by their use for this service are, first, the economy of the power consumption, and, second, the very constant and uniform discharge, which causes no shock, jar or even tremor upon the tubes or shell of the boilers, features which are appreciated by all users of steam pumps, and especially when high pressures are carried. These pumps, driven by belt or direct connected to electric motor, require practically no attention, and their capacity or speed is not affected by any variation in the boiler pressure.

Also shown herewith is a view of the Goulds triplex pump for railway tank service. For this purpose they are driven by gas or gasoline engine and electric motors. Their cost is always less than other methods, and expense for labor and attendance can in numerous cases be dispensed with entirely, as the pump and engine can be quickly stopped and started. When the pumping plant is located near the round house or passenger station the regular employees can give the little attention required without interfering with other duties.

These pumps are manufactured by the Goulds Manufacturing Company, Seneca Falls, N. Y., who are distributing copies of their latest booklet, showing numerous installations and descriptive matter covering many hydraulic problems.

MARINE ENGINE SALE.

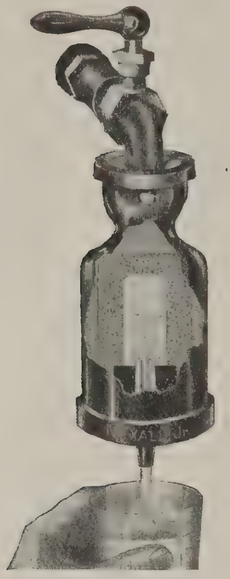
The Strelinger Marine Engine Company, Detroit, Mich., has purchased the business of the Detroit Gas Engine and Machinery Company, of Detroit, which recently became financially involved. The Strelinger Company is well and favorably known at home and abroad, and a successful outcome of its new venture is assured. The company states that it is planning a record breaker in the marine engine line for the year 1908.



GOULD PUMP.

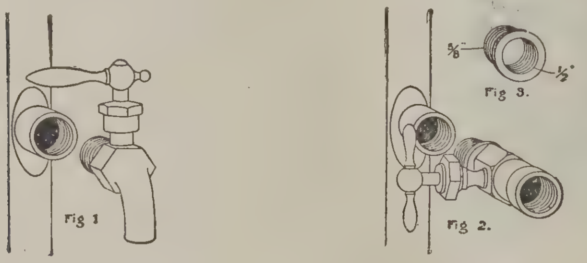
MODERN FILTERS.

People the world over are getting more and more particular both as to the food they eat and the water they drink. Everywhere the necessity and importance of pure water are especially becoming appreciated. Manufacturers have not been slow in taking advantage of these new conditions in getting up such devices as will meet this new demand, and from the large increasing sales of the American Filter Company, manufacturers of the well-known Noxall Filters, it is evident foreign buyers are taking considerable interest in the line. Noxall filters are natural stone filters, simple, neat, inexpensive, easy to attach to any faucet, easy to clean, and are an article of real merit. They are the ideal filters for the export trade, and are made to meet all demands and conditions—from a gravity filter, used where there is no water pressure, to a pressure filter; from the Noxall Junior to the Double Senior; from a small kitchen filter to one large enough to supply an entire household or factory with water that is absolutely pure and as clear as crystal.



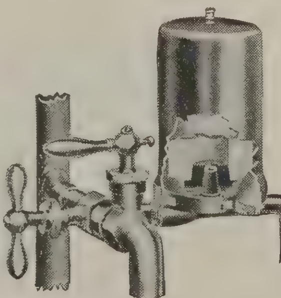
SHOWING PRINCIPLE OF OPERATION.

The Junior is made in one size only, with a rubber top to fit the ordinary kitchen faucet or a small bathroom faucet; also with a screw top to fit a hose bibb. It is made of spun copper and brass, tinned on the inside and highly polished nickel on the outside. The weight complete is one pound. The No. 1 and No. 3 are attached permanently to the side of a faucet. Connections are made to fit Fuller or iron pipe faucets. Ordinary water can be drawn from the faucet in the usual way, and when filtered water is wanted the little handle at the side is turned, which allows the water to pass through the filter.



SHOWING EASE OF ATTACHMENT.

The No. 5 Noxall filter is much the same as the No. 1 and No. 3, only larger, and is used principally in hotels, restaurants and wherever a large quantity of filtered water is required. The Senior and Double Senior are used where all of the water in an entire household or factory is to be filtered. The Senior has one filtering cylinder, size 8x24 inches, while the Double Senior has two filtering cylinders, each 8x36 inches. These filters are made of heavy cast iron, well finished and with ordinary care will last a lifetime. They are not taken apart but are cleaned by the simple turning of a crank a few times round. This can be done by a boy in less than a minute.



NO. 1 NOXALL.

The filtering medium used in all Noxall filters is the well-known Noxall natural stone, which has been tested and recommended by prominent bacteriologists of reputation the world over. It is equal, if not superior, to any filtering medium on the market, besides giving filtered water in much larger quantities. The American Filter Company, Milwaukee, Wis., U. S. A., are open at the present time for negotiations for exclusive agencies for these filters.

NO. 3 NOXALL.

PORTRAITS AND FRAMES.

The Pioneer Portrait and Picture Frame Company, located at 5614 South Halsted street, Chicago, is fast building up an export business that is a solid compliment to its good work and fair dealing. The company takes special pride in the quality of its portraits. It has a special building fitted up at 911 Fifty-sixth street as a studio, where a competent staff of artists, under the leadership of a high-grade artist, turn out the portraits under the most favorable conditions conducive to good work. The confidence this house displays in its work is shown by the fact that it absolutely guarantees the likeness on all portraits, and agrees to fix up free of charge, or make over without cost, any portrait that is not strictly up to standard. This policy invites the confidence of customers in foreign lands. The company is so well known in the United States through its thousands of agents that it is alluded to as "Chicago's best portrait house."

The company is manufacturer and jobber of picture frames and art goods generally, and publishes an illustrated catalogue, that it sends free of charge.

Its correspondence is conducted in all languages.

The company has recently made a change in the management of its foreign department, and is now in position to give all orders and communications of every kind most prompt and careful attention.

RAMBLER EXHIBIT.

Thos. B. Jeffery & Co., manufacturers of the well known Rambler automobiles, did not exhibit at the Show, but held a private sale at their New York salesroom, attracting large crowds.

Sales of Ramblers are exceedingly large, and the manufacturers report a splendid season. Especially popular is the Rambler model 31, which is a strictly high-class four cylinder touring car of medium weight and power, at a low price. Muller, Maclean & Co. are the New York representatives of the Jeffery Company, whose home office and factory is at Kenosha, Wis.

WHEELER PUMPS USED.

The most up-to-date and, for its size, the most economical power plant in the United States is said to be that of the Philadelphia Auto Transit Company, at Thirty-first and Dauphin streets, Philadelphia. This plant, recently erected in record-breaking time by the engineering firm of Drave, Doyle & Co., furnishes power for charging storage batteries of the Auto Transit Company's big electric automobiles, which, as they glide up and down Broad street, with seating capacity for thirty-two passengers, are now one of the novel sights of the city.

In describing the mechanical equipment of the plant it is well to start with the boilers. These are the Heine water tube type, fed by two C. H. Wheeler feed pumps—one always in reserve—and furnish steam at 165 pounds per square inch pressure for three 150 horse-power De Laval steam turbines, each driving two 50 kilowatt generators. The exhaust from all the engines can be turned into either a condensing or non-condensing header, and in cold weather the exhaust from one turbine will be used for heating the building. Ordinarily, however, all the turbine exhaust goes to the condenser, the exhaust from auxiliaries being sufficient for the feed heater needs. The efficiency of a turbine-driven plant is so entirely dependent upon a good vacuum that in this installation the condenser was selected with especial care, and its performance so far has amply justified the choice. It is the C. H. Wheeler improved type, with 1,500 square feet of cooling surface, and a condensing capacity of 12,000 pounds of steam per hour. The vacuum is maintained by a Wheeler-Mullen Suction Valveless Air Pump. This pump removes both air and water in one operation, is extremely simple and compact, and, having no fragile parts, is almost impossible to damage. It is guaranteed to hold a 23-inch vacuum under normal conditions, and because of this high vacuum capacity is especially valuable for turbine installations.

Since city service water is too expensive to be used at the rate of 1,000 gallons per minute for cooling in the condenser, a notable economy has been attained by the installation of two Wheeler-Pratt Cooling Towers. These are located on the roof of the building, and cool 1,000 gallons of water per minute from the condenser temperature to about 73° Fahr., depending upon weather conditions. The water is circulated through the condenser and elevated to the top of the towers by two centrifugal pumps. One, for ordinary loads, is of 15 horse power, driven by a De Laval Steam Turbine, and a second, for lighter loads, is 5 horse power and motor driven.

Although the intention of this article is to treat primarily of the steam equipment, it would hardly do to ignore entirely the electrical feature, so, let us return for a moment to the turbines. As already noted, each of the three turbines drives two D. G. generators of 50 kilowatt capacity each, making a total of 300 kilowatts delivered at the switchboard; but it is delivered at three separate voltages—20, 100 and 110 volts, respectively. The batteries are six hours in charging, two hours on each voltage, starting on the lowest and finishing on the highest, after which the battery furnishes power for three return trips of a four-ton auto between Dauphin and Spruce streets, a distance altogether of about 30 miles.

As a whole, the plant has shown remarkably constant efficiency under varying loads; and when tested at about 80 per cent. load the water consumption per kilowatt hour at the switchboard was only 27.8 pounds. This included all steam consumed by the auxiliaries, and for a 300 kilowatt installation is probably close to record figures. This is only one of many recent contracts which have brought the C. H. Wheeler Manufacturing Company to the fore.

TELEPHONE COMPANY EXPANDS.

The Wire and Telephone Company of America recently purchased the entire equipment and stock of the Reed Electric Cordage Company, of Syracuse, N. Y. This additional equipment gives the Wire and Telephone Company a manufacturing capacity such as enables them to take care of their rapidly growing demand, not only for bare copper wire, magnet wire and rubber covered wire, but all grades of weatherproof, office, fixture and annunciator wire. The well established trademark "Romeoid" is a guarantee of quality, and has given this progressive company an excellent standing in the trade.

ROAD TRAIN.

The Alden Sampson Manufacturing Company, of Pittsfield, Mass., has been closely identified with the automobile industry for the past six years, but the road train seen at the New York Show is the first product which the company has placed upon the market under that name.

This company is also building industrial trucks of three and five tons capacity, and also a limited number of high powered pleasure cars, designed to compete only with imported cars and equipped with bodies to special order.

TRADE PUBLICATIONS

Prairie Type Locomotives.—The American Locomotive Company has just issued the tenth of its series of catalogue pamphlets, which illustrates and describes the Prairie type locomotives built for various roads. This pamphlet contains half-tone illustrations, and the principal dimensions in tabulated form of fifteen different designs of locomotives of this type, ranging in weights from 136,000 to 245,000 pounds.

The usual style of pamphlet adopted by this company is followed, beginning with the description of this class of locomotives and presenting the advantages which it offers for fast freight and passenger service.

Incubators.—The Reliable Incubator and Brooder Company, Quincy, Ill., is about to issue its new 1908 catalogue, which will be more elaborate than any edition yet issued by this company.

The company has also just completed a new Spanish catalogue for distribution.

Drilling Machinery.—The Cyclone drill, made by the Cyclone Drill Company, of Orville, Ohio, is fully described in the company's handsome new booklet. These drills are now being used in almost every civilized country. Since their first introduction improvements were rapidly made as fast as the defective or objectionable features were discovered, as is common in every piece of machinery that has ever been built.

In the construction of the Cyclone drills are embodied many features that go to make a machine of the best type and most perfect construction throughout.

The principal features of the hollow rod and cable drills are the tilting bar or spudding device; worm gear feed for letting out slack; all operating levers placed handy for operator; simplicity of construction; equalized load; few working parts; perfect design and proper proportion of parts; light power required to operate; strong wagon; substantial derrick; turned and ground sheave wheels; few parts to wear; high speed; superior drop; low price.

The light power required to operate the drills is demonstrated by one customer who completed a test hole near Patoka, Ill., 988 feet deep with a No. 2 hollow rod drill; the engine being the regular size 5½x7 inches; this is the deepest hole that has ever been drilled with a hollow rod machine.

PUBLISHER'S PAGE

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The AMERICAN EXPORTER is both independent and impartial. Its publishers have no connection with any manufacturing concern, export house or other business except publishing, and hence have no outside interest to serve. The editorial management is separate and distinct from the business department.

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INFORMATION DEPARTMENT.

One of the busiest corners of our offices is the Information Department, where questions asked by our 550 advertisers are answered. The majority of the queries are in reference to the financial standing and reliability of foreign customers seeking credit, or firms abroad which desire to secure exclusive sales agencies of American machinery and products. Numerous questions are received also concerning methods of shipment, consular invoice requirements, prospects for sales in various localities, names of possible agents, etc.

Advertisers receive this information without any extra charge whatever. Non-advertisers cannot receive the services of the Information Department at any price.

It is very much to the advantage of reliable foreign firms to file with us references which we may investigate and report on when called upon to do so by our advertisers.

While we have ratings on thousands of firms, occasions arise when it is necessary to send abroad for fresh information. This causes a slight delay in the negotiations between buyer and seller.

Take time by the forelock and file your references with us now. You never know when you will be glad that you have done so, thus convincing American manufacturers of your good faith and responsibility and greatly facilitating future correspondence.

Send us American banking references, if possible; also well-known European houses of whom we may inquire. Details of capital, names of active partners and general reports of business will aid American manufacturers in giving you credit and quoting the most favorable terms.

INDEX TO ADVERTISERS.

Attention is called to the improved arrangement of the classified index to advertisers, which goes into effect with the current issue. The number of advertisers in the AMERICAN EXPORTER has grown to such a large number, and the variety of lines represented by these manufacturers is so great, that it was deemed necessary to arrange the classified index to advertisers in a more simple and convenient form.

By the present system there has been some slight combination of headings in certain lines, thus reducing the index to the simplest form.

EUROPEAN TOUR TERMINATES.

The AMERICAN EXPORTER'S European Trade Tour—in many ways one of the most successful of all the AMERICAN EXPORTER'S foreign trade tours—ended Sunday, November 10, when Mr. B. Olney Hough sailed from England, by the Kaiser Wilhelm II. Mr. Hough's trip began July 3 and has, therefore, lasted a trifle over four months.

CUBAN TRIP.

Mr. Clinton P. Lampman, Western manager of the AMERICAN EXPORTER, is now in Havana, making our Cuban Trade Tour. American manufacturers and Cuban importers are invited to address him, care of Hotel Inglaterra, Havana, Cuba.

PROTECT YOUR HEALTH

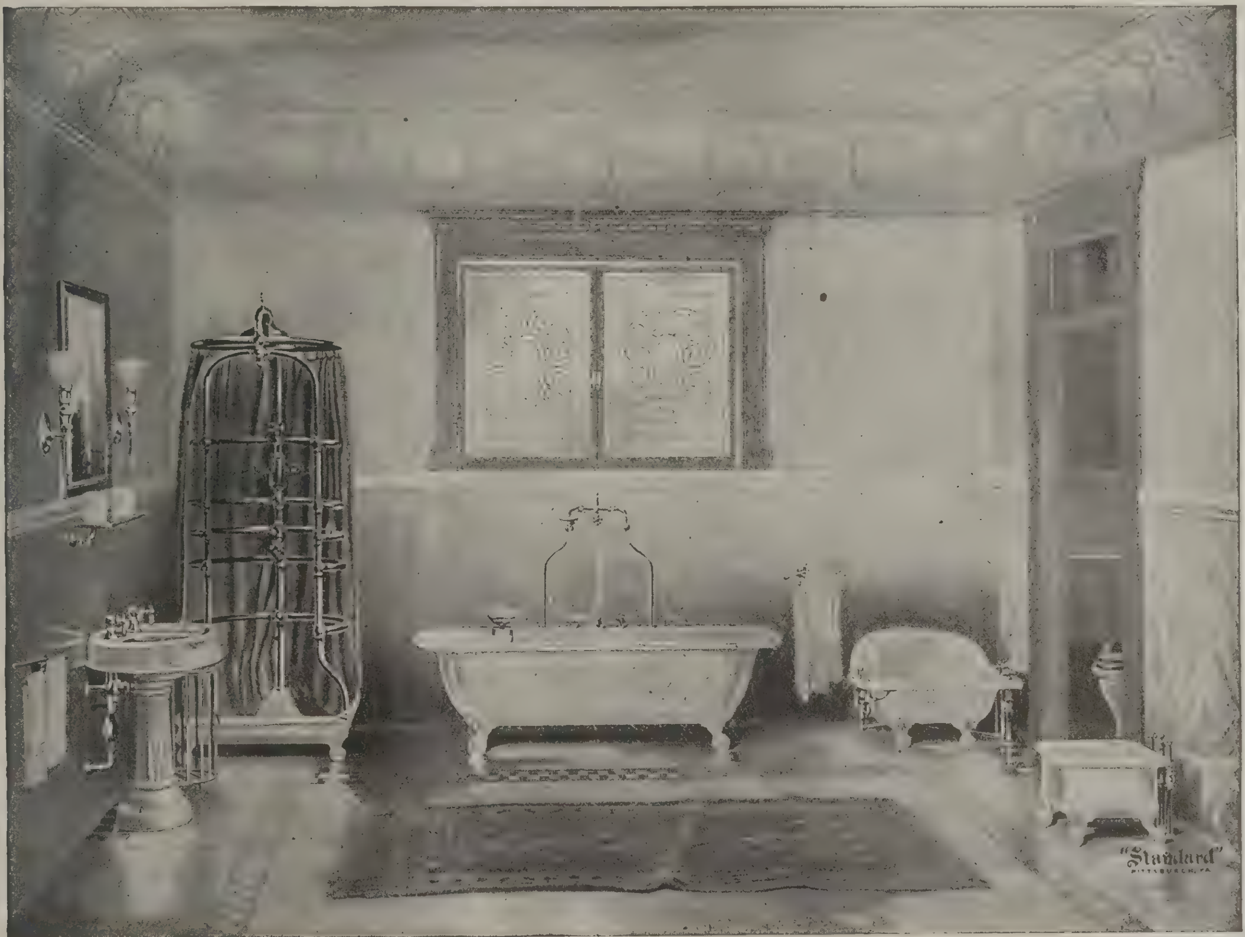
by using only reliable, modern plumbing fixtures, thus evading the risks and serious consequences invariably connected with the installation of inferior goods.

"Standard" Plumbing Fixtures

are high grade, reliable and a safeguard against these dangers. These qualities alone constitute one of their highest recommendations, in addition to which their superiority in design and consequent elegance in appearance cannot but appeal to the user. Architects, engineers, contractors and the medical profession, as also the public at large, acknowledge the importance of installing plumbing goods, no matter where used, that will give sanitary satisfaction and save trouble and costly repairs. Install **"Standard"** Goods and you will achieve the desired results and save money.

"Standard"

Enameled Baths, Lavatories, Closets, Sinks and Nickel-Plated Brass Goods bear the makers' "Green and Gold" Guarantee Label besides their trade-mark **"Standard"**



Bath and toilet room outfits of all descriptions—from the smallest and cheapest to the most elaborate.

Address our FOREIGN SALES DEPARTMENT for full particulars and we will send you illustrated and descriptive printed matter. Correspondence in foreign languages.

Standard Sanitary Mfg. Co.

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35-37 West 31st St., New York City.
22 Holborn Viaduct, London, E. C., England.

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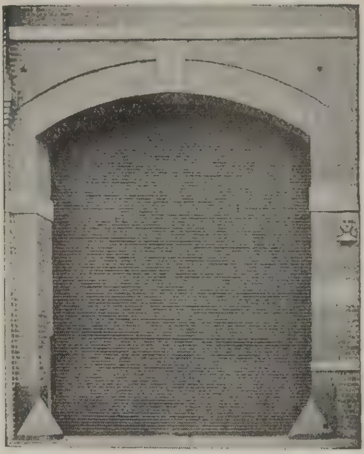

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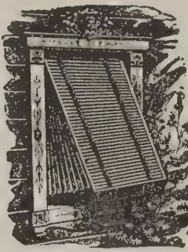

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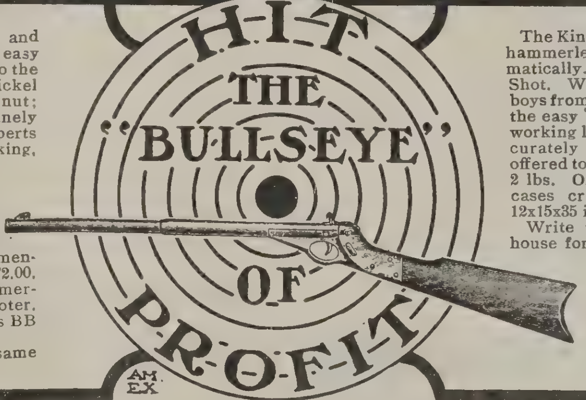

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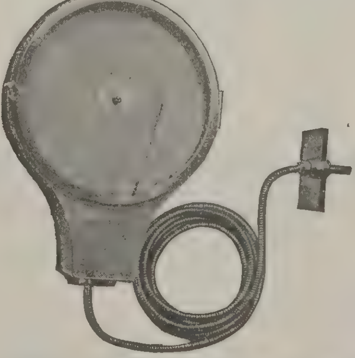

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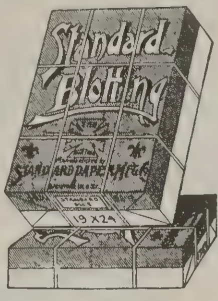

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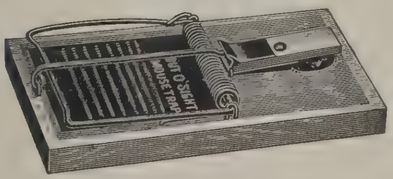
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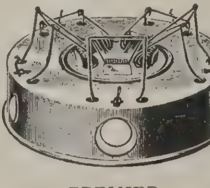

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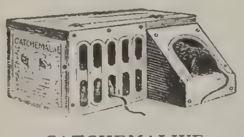

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Arranged according to lines of business

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- AGRICULTURAL IMPLEMENTS
- AUTOMOBILES
- BUILDING MATERIAL
- CARRIAGES, WAGONS, HARNESS
- FURNITURE
- HARDWARE TRADE
- MACHINERY, GENERAL AND ENGINE SUPPLIES
- MACHINERY, SPECIAL
- MARINE EQUIPMENT
- MISCELLANEOUS
- MUSICAL INSTRUMENTS
- RAILROAD EQUIPMENT
- SHOES, CLOTHING, ETC.
- SPORTING AND ATHLETIC GOODS
- STATIONERY AND OFFICE SUPPLIES

Merchants will find this directory of much assistance in placing orders with manufacturers. Should any goods desired not be listed here, the American Exporter would be pleased to furnish a specially prepared list, or advise manufacturers of our readers' requirements. Kindly mention this publication in corresponding with advertisers.

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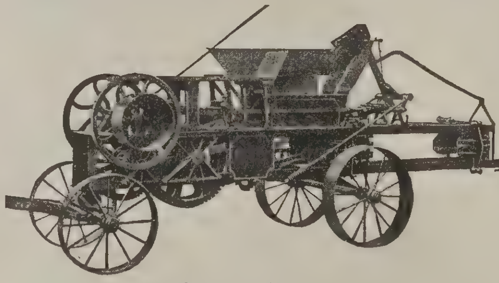

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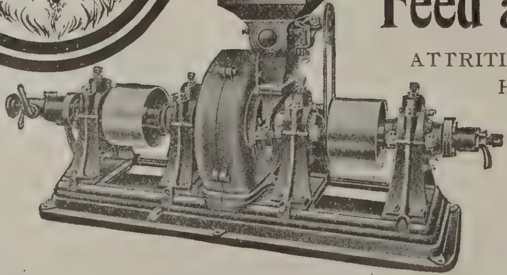

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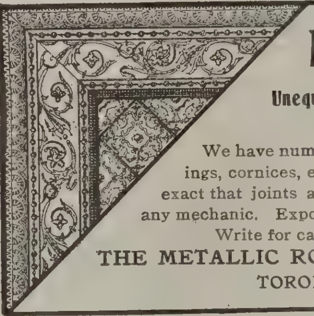

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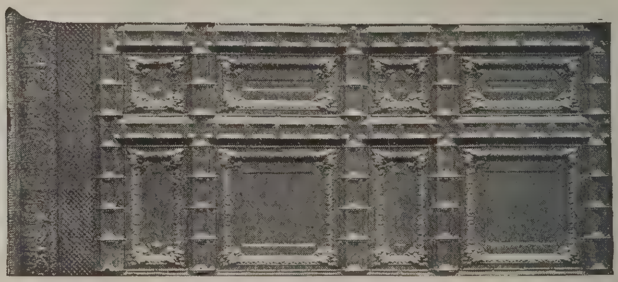

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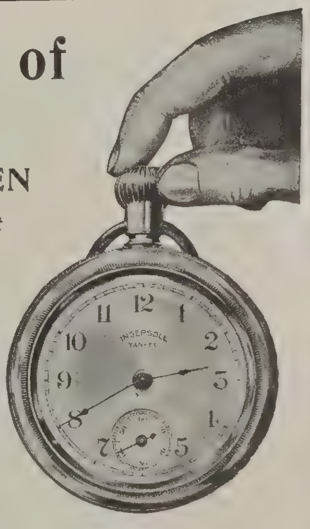

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Iwan Bros., Streator, Ill. (*Post Hole Augers.*)
Ohio Implement Co., Bowling Green, O. (*Farming Tools.*)

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Best Light Co., The, Canton, O. (*Gas Lamps and Lighting System.*)
Bolte & Weyer Co., Chicago, Ill. (*Gas Lamps and Lighting Systems.*)
Canton Incandescent Light Co., Canton, O. (*Gasoline Lamps.*)
Chicago Solar Light Co., Chicago, Ill. (*Gasoline Lighting Systems.*)
Dietz Co., R. E., New York, N. Y. (*Hand Lanterns.*)
Manhattan Screw & Stamping Co., New York, N. Y. (*Acetylene Lamps.*)
National Stamping and Elec. Works, Chicago, Ill. (*Gasoline Lighting Systems.*)
Plume & Atwood Mfg. Co., New York, N. Y. (*Kerosene Lamps.*)
Standard-Gillett Light Co., The, Chicago, Ill. (*Gasoline Lamps.*)
Sun Vapor Light Co., The, Canton, Ohio. (*Alcohol and Gasoline Lamps.*)
Superior Mfg. Co., Ann Arbor, Mich. (*Gasoline Lamps and Lighting System.*)
Welsbach Co., Gloucester, N. J. (*Gas Lamps.*)

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Granite State Mowing Machine Co., Hinsdale, N. H.
Greene Mfg. Co., Springfield, Ohio. (*Lawn Sweepers.*)
Philadelphia Lawn Mower Co., Philadelphia, Pa.

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Richards Mfg. Co., New York, N. Y.

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Acme Steel Goods Co., Chicago, Ill. (*Box Strapping.*)
Allen Co., L. B., Chicago, Ill. (*Soldering Salts.*)
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American Filter Co., Milwaukee, Wis. (*Filters.*)
Animal Trap Co., Lititz, Pa. (*Traps.*)
Billings, Clapp Co., Boston, Mass. (*Soldering Salts.*)
Cape Ann Anchor Works, Gloucester, Mass. (*Anchors.*)
Cary Mfg. Co., New York, N. Y. (*Box Strapping.*)
Dayton Supply Co., Dayton, O. (*Cuspidors.*)
Eureka Fire Hose Co., New York, N. Y. (*Rubber Hose.*)
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Oneida Community, Ltd., Oneida, N. Y. (*Chains and Animal Traps.*)
Phœnix Glass Co., The, New York, N. Y. (*Glass Lamp Shades.*)
Standard Oil Cloth Co., New York, N. Y. (*Oil Cloth.*)
Stewart Iron Works Co., Cincinnati, O. (*Ornamental Iron and Wire Works, Railings, Settees, etc.*)
Wiebusch & Hilger, New York, N. Y. (*General Hardware.*)

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Henderson & Johnson, Gloucester, Mass.
Johnson & Son, S. C., Racine, Wis. (*Paint and Varnish Solvent.*)
Kinloch Paint Co., St. Louis, Mo.
New Jersey Paint Works, Jersey City, N. J.
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Goodell-Pratt Co., Greenfield, Mass. (*Carpenters' Tools.*)
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Peninsular Tool and Specialty Co., Detroit, Mich. (*Molders' Tools.*)
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Ripley Pipe Wrench Co., The, Ripley, N. Y. (*Pipe Wrenches.*)
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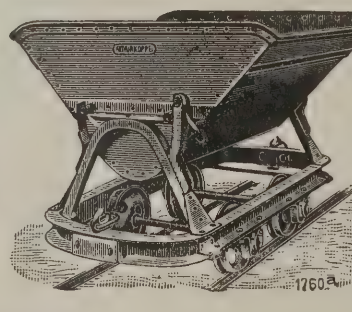

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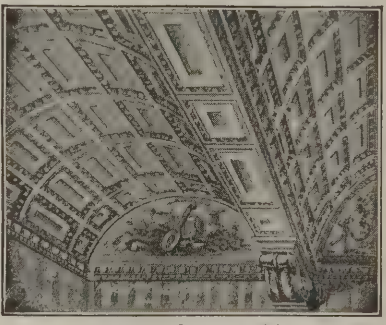

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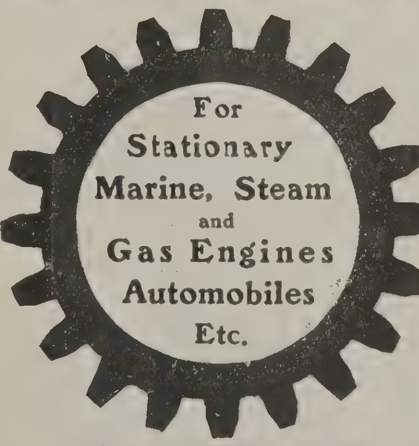

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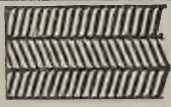

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Salem Iron Works, Winston-Salem, N. C.
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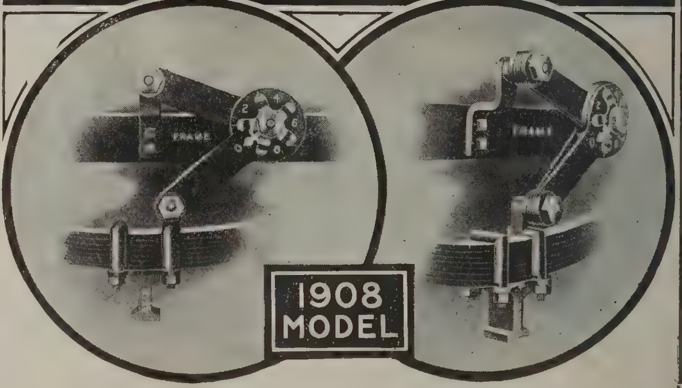

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Fay & Bowen Engine Co., Geneva, N. Y.
Ferro Mach. & Fdy. Co., Cleveland, O.
Gas Engine & Power Co., New York, N. Y.
Hildreth Mfg. Co., Lansing, Mich.
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Palmer Bros., Cos Cob, Conn.
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United Mfg. Co., Detroit, Mich.
Wolverine Motor Works, Grand Rapids, Mich.

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Kelley & Co., Boston, Mass. (*Leather.*)
Lawrence Leather Co., A. C., Boston, Mass. (*Leather.*)
Lynn Wood Heel Co., Boston, Mass. (*Wood Heels.*)
Spencer, C. A., Boston, Mass. (*Tanners' Materials.*)
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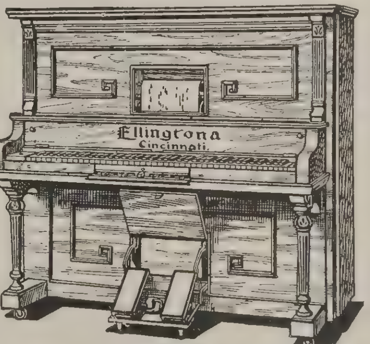

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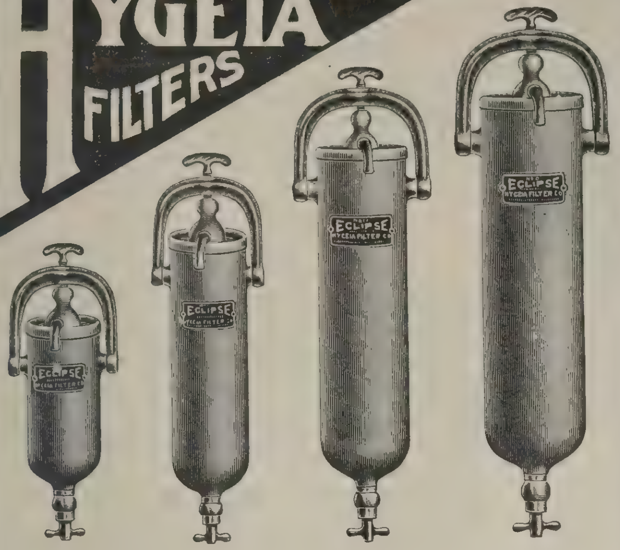

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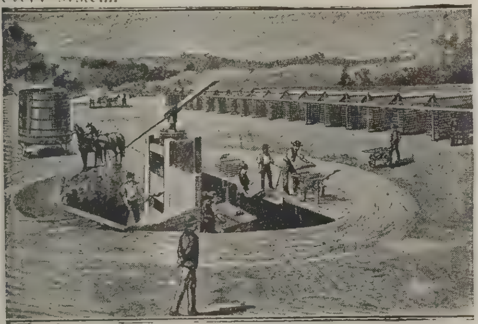

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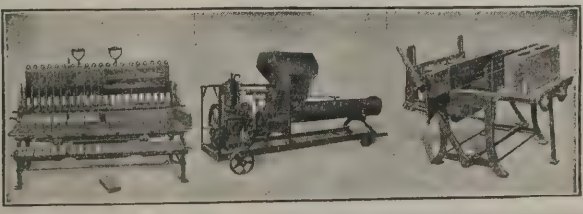

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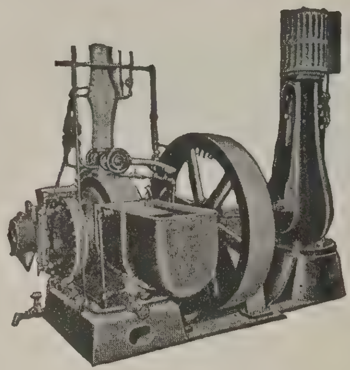

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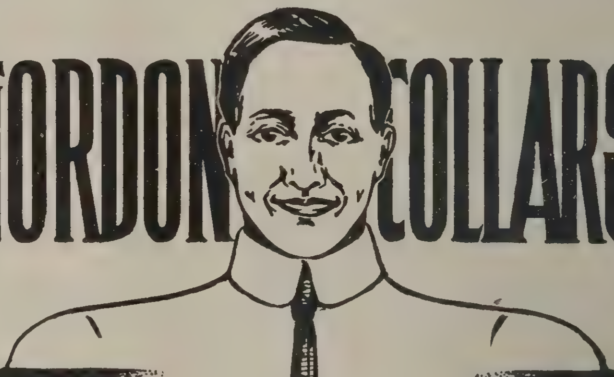

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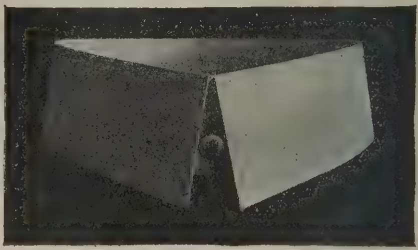

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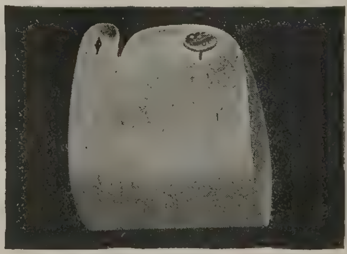

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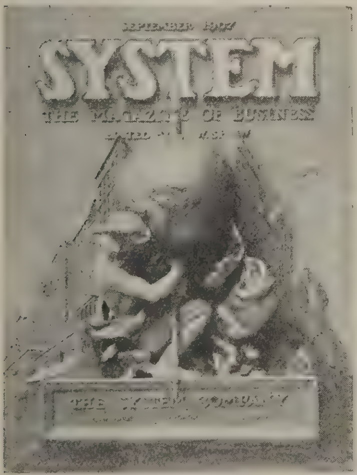

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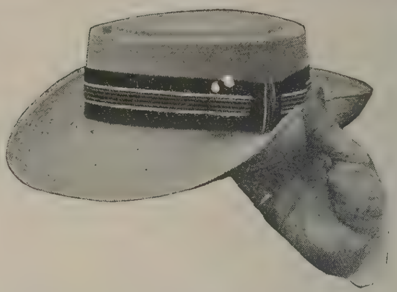

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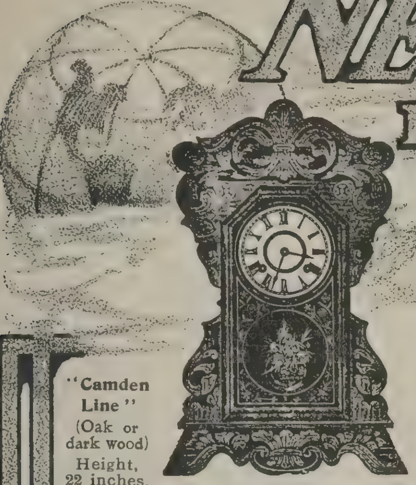

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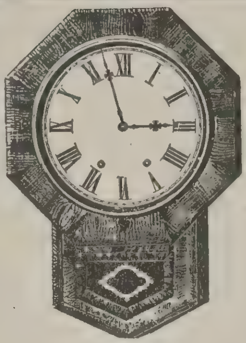

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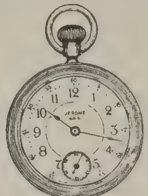

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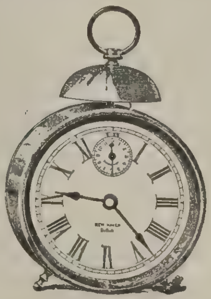

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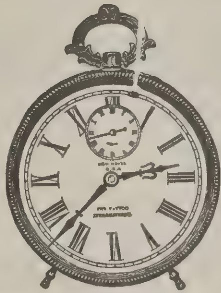

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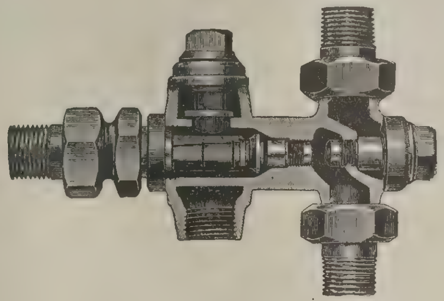

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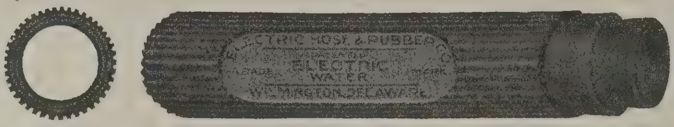

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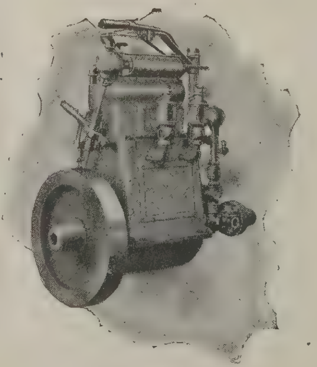

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P. & A. Royal Lamps and Banner Burners

SAFE AND SATISFACTORY

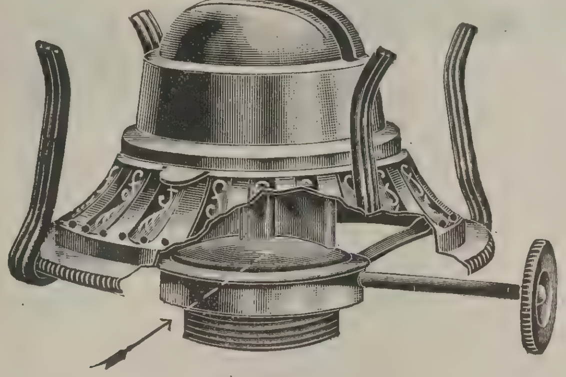
The best ALL BRASS burner on the market.

No. 2 Royal Chimney and 10 inch Opal Dome Shade furnished separately.

No. 1942. Size 2 Royal

CENTER DRAFT.

Takes No. 2 Royal chimney and wick. 12 inches high to top of flame spreader. Packed one dozen to a case, with 10 inch tripods. Case measures 4 cubic feet. Gross weight, 51 lbs.; net weight, 27 lbs.



Banner Burner

No. 105, Size 0, takes ½ in. wick. No. 106, Size 1, takes ⅝ in. wick. No. 107, Size 2, takes ⅞ in. wick.

ALL BRASS

Screw cap is covered and protects against fire. Some burners are made cheaper by leaving the lower part open, so that all dust, dead insects and sweat oil collect in base of burner and catch fire.

OURS DON'T

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Little Royal Chimney and 6 inch Opal Dome Shade furnished separately.

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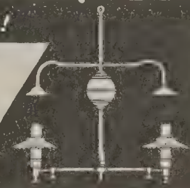
Takes Little Royal chimney and wick. 8½ inches high to top of flame spreader. Packed two dozen to a case, with 6 inch tripods. Case measures 3 cubic feet. Gross weight, 44 lbs.; net weight, 18½ lbs.

The "SUN" OUTSHINES THEM ALL!



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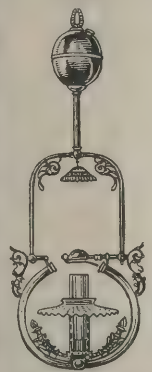
INCANDESCENT
GASOLINE (PETROL)

LAMP



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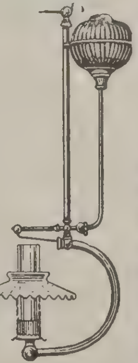

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Made in one, two, three and four burner fixtures; pendant, chandelier, wall and bracket styles. 100 candle power to each burner.

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Oldest Lamp Manufacturers in Canton—established 22 years before any present similar Canton concern.

200 CANDLE POWER

400 CANDLE POWER

Our trade mark, the "Sun," in addition to countries already registered, has now been registered in Argentina, Uruguay, Paraguay, Chili, British India, Great Britain, Cape Colony, Natal, Rhodesia, Transvaal, Orange River and Dutch East India.

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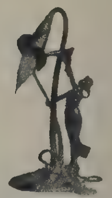
ELECTROLIERS AND NEWELS

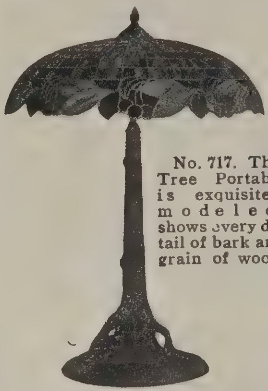
In designs from the cheapest to the most artistically elaborate. Our goods are straight and plumb and mechanically constructed. Finishes are lasting and attractive.

Candelabra, gas or electric, one of hundreds of designs.

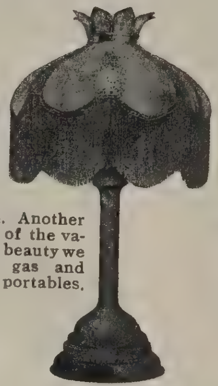


Electrolier, can also be furnished as a gas stand, one of many different designs.

We furnish these goods fitted and shipped complete ready for lighting, with the exception of the bulbs or lamps, which it is best to obtain locally to avoid risk of breakage in shipment. Our goods are packed securely for shipment abroad.



No. 717. This Tree Portable is exquisitely modeled, shows every detail of bark and grain of wood.



No. 684. Another example of the variety and beauty we offer in gas and electric portables.

Our catalog contains illustrations of some of the hundreds of various designs of gas and electrical portables we manufacture. Each electric stand is wired ready to light. We are fully prepared to fill export orders promptly and satisfactorily.

Clock of fine Ormolu gold or Turinese bronze, one of many beautiful designs.

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Correspondence invited from dealers in these goods all over the world.

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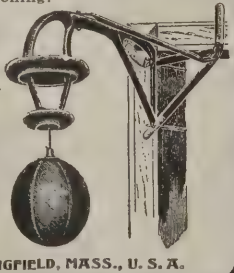

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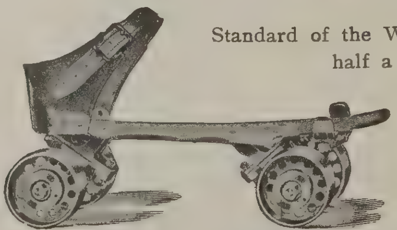

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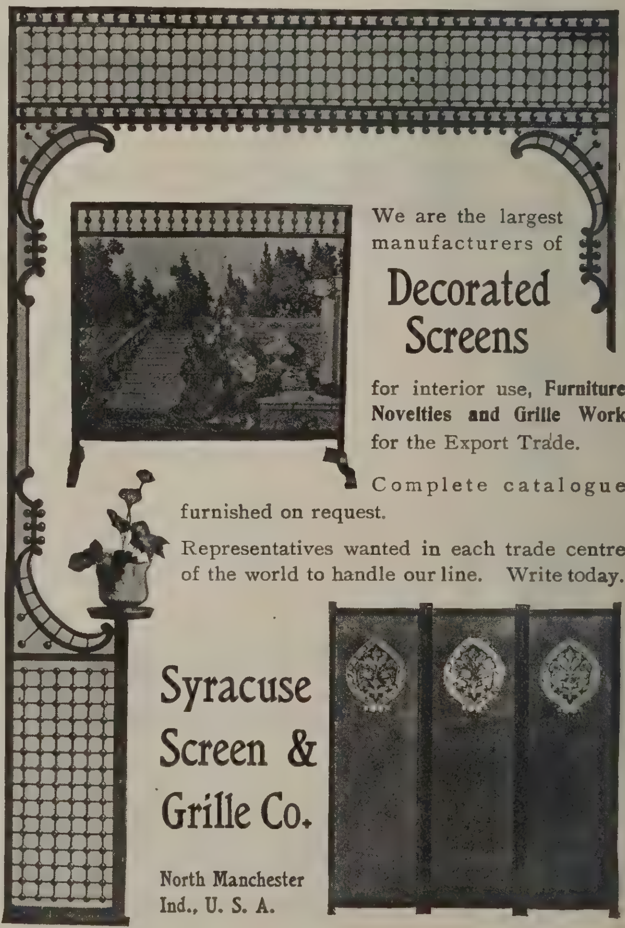

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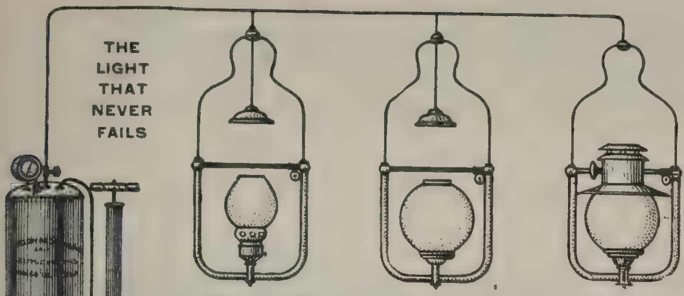

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are of highest quality—the recognized American standard for durability, convenience and appearance. Our No. 0 Apex Tubular here shown has No. 1 burner, 5/8-inch wick and guaranteed to give good service and satisfaction. Price, $4.25 per doz., f. o. b. New York. Write for export prices and particulars.

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HYDRO CARBON LIGHT
THE STANDARD LIGHTING SYSTEM MANF'D BY THE STANDARD GILLETT LIGHT COMPANY CHICAGO, U.S.A.

No Wick
No Odor
No Dirt

Healthful White Light. Soft on the Eyes

THIS WONDERFUL LIGHTING DEVICE

Yields a powerful light of 500 candle-power per mantle, and using as its fuel either

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Something Entirely New and Progressive

Only ONE reservoir for all lights in use. Fuel fed under a low pressure, insufficient to burst a paper bag, to any part of building. Pipes 1/8 in. outside diameter, flexible brass. The cheapest, safest and best light on earth for Stores, Homes, Streets, Offices, etc. Exclusive representation granted. Booklet Free.

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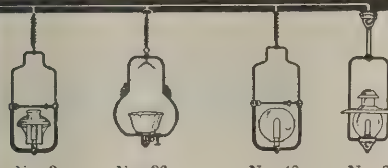
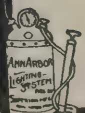


Ann Arbor Lighting (Gasoline) System

Every importer of gasoline lighting devices should handle a line of Ann Arbor Wire Feed Gasoline Lighting Systems.

We will ship a trial System, illustrated herewith, consisting of one ten-gallon pressure tank, equipped with gauge and foot pump, one each of lamps Nos. 39, 40, 36, and No. 8 street lamp, together with 100 feet of wire tubing, with all connections, ready to install, for **$32.25 net, f. o. b.** New York. Without street lamp, $24.25, f. o. b. New York. Additional lamps Nos. 39, 40 and 36, $3.75 each. No. 8, $7.00 each. Wire tubing, 4 cents per foot net, including connections. Tank has enough capacity to operate 15 lights. Each light gives 500 to 600 candle power. Three lights will illuminate a space 30 x 75 feet as bright as day. Fixtures are adjustable to any height. No trouble to install. A screwdriver is the only tool required.



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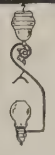
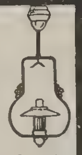
Ann Arbor Incandescent Lamps



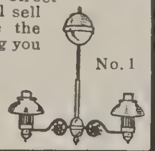


We also manufacture a complete line of individual lamps which sell readily where Systems are not desired. They operate on the same principle as the Ann Arbor Lighting System except that each lamp carries its own fuel supply.

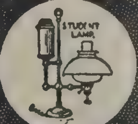
Special Offer. For $52.00 we will send six each of Nos. 10 and 14, and one each of No. 19 and the street lamp. This stock will sell readily, and will be the means of introducing you to a profitable trade.

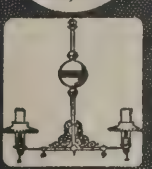
Send for sample outfit at once.

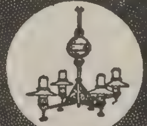
Catalog free.



THE "BEST" LIGHT


STUDENT LAMP.





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Lamps Use Gasoline (Petrol) and Alcohol.
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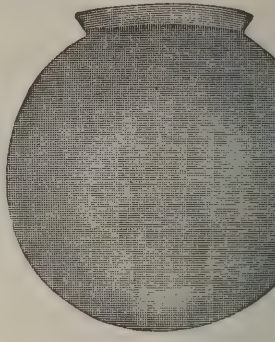

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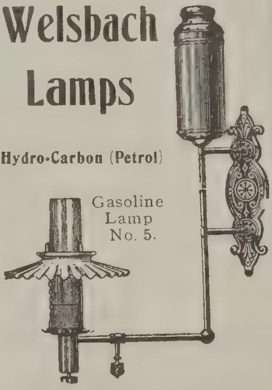
Welsbach Lamps



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Lighted instantly with a touch of the match--no wait, no bother. Each lamp complete and its own gas producer. Burners 100 candle-power. Single burners or clusters—all styles. Responsible foreign firms write for territory and export terms.

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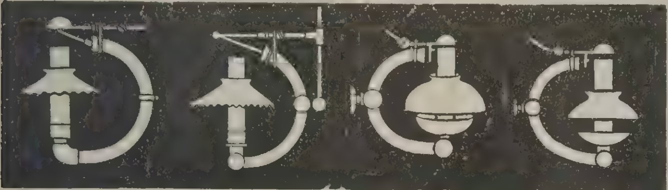

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that are always ready for use and can be handled by anyone, or our

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1,200 Candle Power.
Operates 12 hours on One Gallon of Gasoline.
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Let us prepare and submit designs for your advertising, FREE OF CHARGE.

We make advertisements that bring business.

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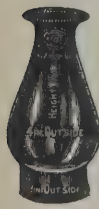

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FOR ALL LAMPS AND BURNERS MADE

Beware of Imitations and Fraudulent Copies of Our Trade Mark on Both Chimneys and Paper Wrappers

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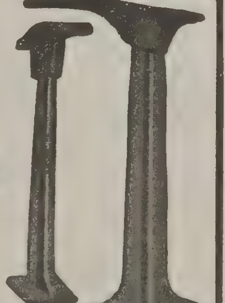

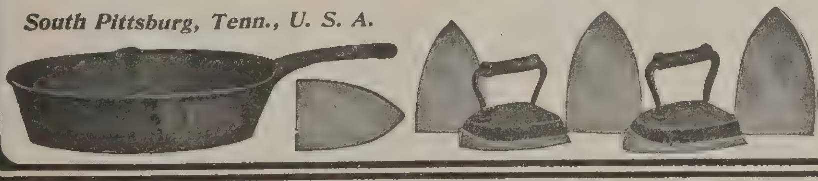

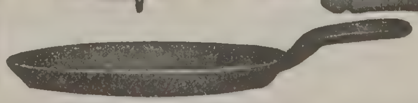

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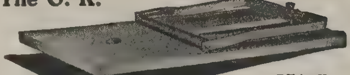

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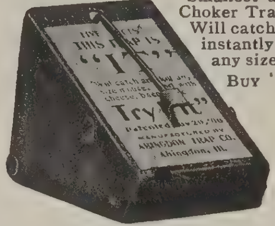
The only self-setting trap on the market. No pedal. The weight of the animal springs the trap.

The "IT" Trap


TRY THIS TRAP IT'S "IT"
Try "IT"
ABINGDON TRAP CO.
Abingdon, Ill.

Smallest and best Choker Trap made. Will catch and kill instantly mice of any size.

Buy "IT."

ABINGDON TRAP CO., Abingdon, Ill., U. S. A.

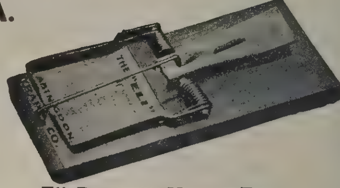
Cable Address: "ABTRAPCO"

EXCLUSIVE TRAP MAKERS

The O. K. Rat Trap

A safe, durable and reliable catcher. Sure to please.

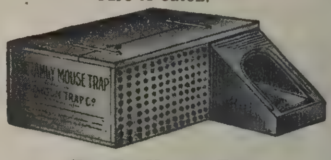
All Traps Guaranteed



Eli Rat and Mouse Traps

The Best Pedal Traps Made.

Easy to keep clean, easy to operate, and sure to catch.



Family Mouse Trap

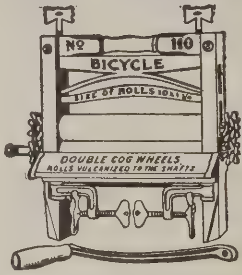
Self-setting. Always ready.

LOVELL MFG. CO., Erie, Pa., U. S. A.

Export Department: 86 Warren St., New York

Manufacturers of a full line of

Anchor Brand Clothes Wringers, Rat and Mouse Traps



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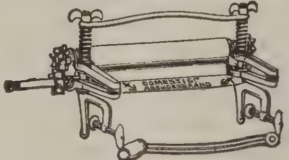
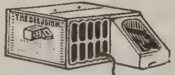


We make a full line of

CLOTHES WRINGERS

for the Export Trade.

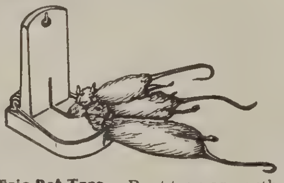


Delusion Mouse Trap

Requires no setting.

Rex Trap

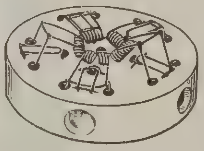
Made in two sizes; large size for rats, small size for mice.



Erie Rat Trap.—Best trap on earth

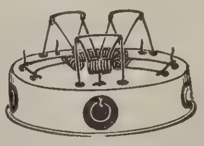
RAT TRAPS: "Erie," "Star," "Grip," "Slayer," "Gem," "Yankee," "Rex," "Sure Catch"

MOUSE TRAPS: "Delusion," "Mascotte," "Household," "Lovell's Metallic Choker," "Easy-Setting Wood Choker," "Cyclone," "Yankee," "Rex" and "Sure Catch."



Lovell's Easy-Setting Wood Mouse Trap.

Catalogue of Wringers in English only, and of Rat and Mouse Traps in both English and Spanish.



Lovell's Easy-Setting Metallic Mouse Trap.

ANIMAL TRAPS

EVERY DEALER who is interested in Traps should acquaint himself with those made by the

Oneida Community

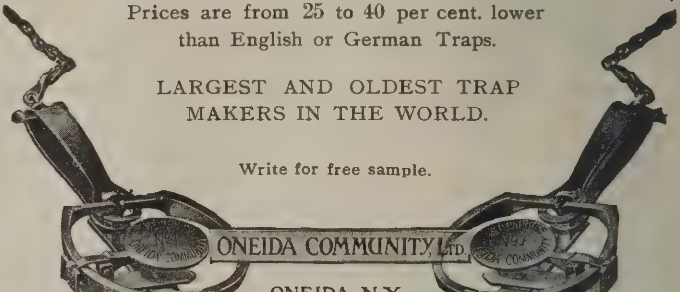
Light, compact and strong, they are sure to go and sure to hold.

Twenty-one sizes for catching every known animal.

Prices are from 25 to 40 per cent. lower than English or German Traps.

LARGEST AND OLDEST TRAP MAKERS IN THE WORLD.

Write for free sample.

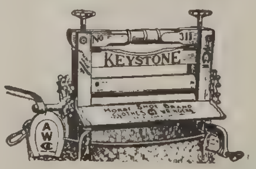


ONEIDA, N.Y.,
U.S.A.

UNIVERSAL WRINGER.

No. 350.	Rolls	10 x 1¾
" 351.	"	11 x 1¾
" 352.	"	12 x 1¾

KEYSTONE WRINGER.


No 311
KEYSTONE
HORSE SHOE BRAND CLOTHES WRINGERS
AWC

No. 310.	Rolls	10 x 1¾
" 311.	"	11 x 1¾
" 312.	"	12 x 1¾

HORSE SHOE BRAND

TRADE AWC MARK

CLOTHES WRINGERS

EVERY ONE WARRANTED.

MANGLING MACHINES

on stands and for use on tables.

The American Wringer Co.

99 Chambers Street NEW YORK, U. S. A.

Write for Catalog, Price List and Discount Sheet.

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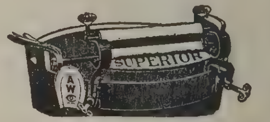


No. 210.	Rolls	10 x 1¾
" 211.	"	11 x 1¾
" 212.	"	12 x 1¾

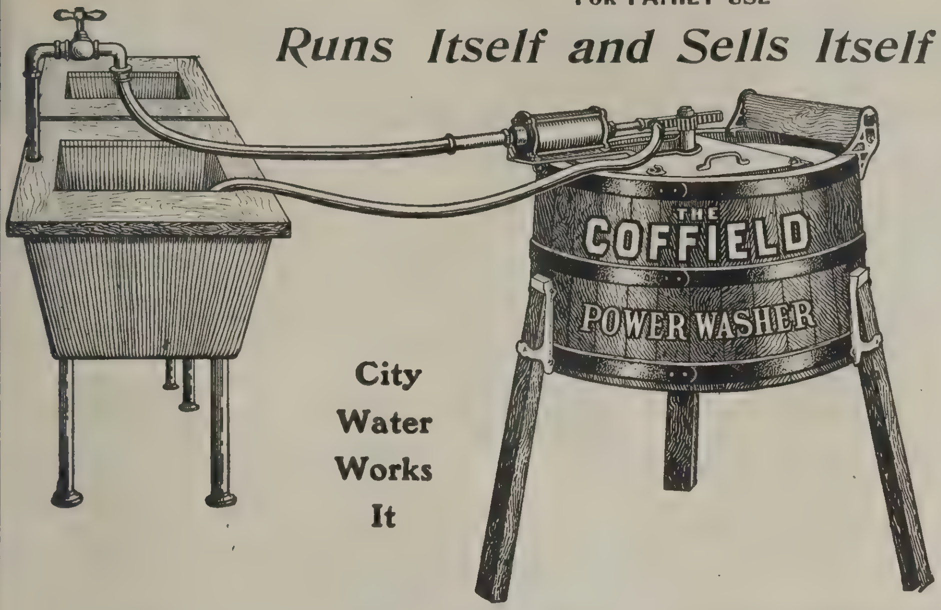
HOUSEHOLD MANGLE.

No. 24. Ball-Bearing Roll, 24x3½

THE COFFIELD POWER WASHING MACHINE

FOR FAMILY USE

Runs Itself and Sells Itself



City Water Works It

The Coffield Power Washing Machine is strictly a self-working washer, operated by the city water pressure. The Motor is made of brass throughout and will not rust. It is simple and strong—never gets out of order and will last a lifetime. The tub is built from a selected grade of cypress, the best material obtainable for the purpose, and is filled and varnished in a natural finish. The entire construction is such as to make this THE MOST DURABLE AND SANITARY WASHER on the market.

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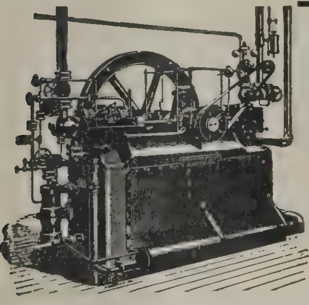

Established 1867.

The Vilter Mfg. Co.

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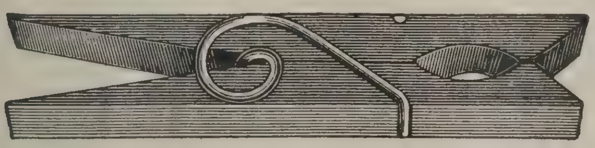
Ice and Refrigerating Machinery

Corliss Steam Engines, Boilers, Pumps, etc.

Machinery for Brewers and Bottlers.

The Holdfast Clothespin



ALSO ADAPTED FOR

Trousers Hangers, Skirt Hangers, Etc.

A perfectly rigid pin—practically indestructible.
Clothes put on the line with the Holdfast can never blow off.
The pin is easily removed when frozen to line (simply spring open top of pin).
It will not tear the most delicate fabric.
The spring is galvanized wire—warranted never to rust.

ORDERS FILLED THROUGH COMMISSION HOUSES.

CORRESPONDENCE SOLICITED.

The Demeritt & Palmer Packing Co.

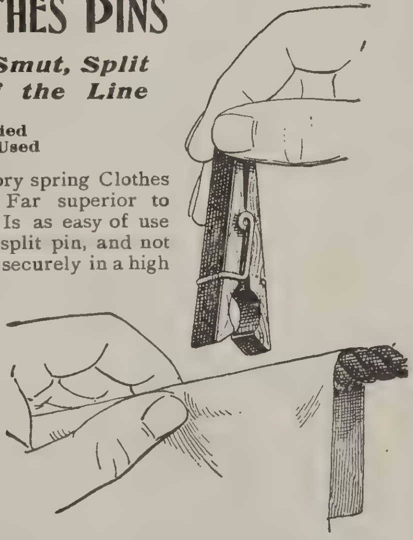
Waterbury, Vermont, U. S. A.

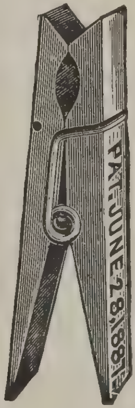
U. S. CLOTHES PINS

Never Rust, Smut, Split or Blow off the Line

Once Tried
Always Used

The only satisfactory spring Clothes Pin ever invented. Far superior to common split pins. Is as easy of use as the old fashioned split pin, and not only holds the clothes securely in a high wind, but does so in a VELVET-LIKE CLASP, preventing any possible injury to the most delicate fabric. Neither the pins nor clothes are to be found in the mud or dirt.





Is the ONLY ONE that firmly clasps the fabric to the line.

Especially desirable for Export. Sold by leading grocery and woodenware dealers the world over.

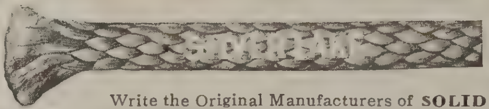
Any Special Clips Made to Order.

Write for export prices and particulars. Correspondence in all languages,

U. S. CLOTHES PIN CO.

MONTPELIER, VT., U. S. A.

SILVER LAKE CO. Boston, Mass., U. S. A.



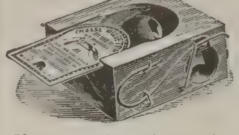
SOLID BRAIDED SASH CORD Railroad Bell Cord, Trolley Cord and Clothes Lines

SILVER LAKE Cord has an international reputation and has been recognized as **THE STANDARD** for nearly 40 years.

It is made in all sizes, and has a hard braid and smooth finish which makes its appearance and wearing quality the best. Suitable for all weights and pulleys. Our name is stamped on our cord. **THE BEST IS THE CHEAPEST.**

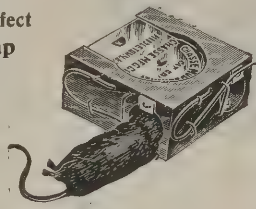
Write the Original Manufacturers of **SOLID BRAIDED CORD** for samples and **EXPORT PRICES.**

The Chasse Patent Mouse Trap



beats all old style choker traps.

The Only Perfect Mouse Trap



Clean. Easier to bait and set. Never fails.
Two sizes: one and three hole.

CHASSE MFG. CO.
Factory: Middletown, N. Y.
55-57 Vesey St., New York, U. S. A.

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Foreign Agents Wanted

One of the largest manufacturers of refrigerators in the United States desires to make business connections with responsible parties. Liberal terms and arrangements.

McCray Refrigerators

Opal Glass, Tile or Whitewood Lined

are made in stock sizes and built to order for Residences, Clubs, Hotels, Markets, Hospitals, Public Buildings, etc. The best refrigerating system for warm climates. Gives perfect circulation of pure, cold, dry air, and is economical in use of ice. Write for catalog and full information. Catalog No. 81 for Residences; No. 46 for Hotels, Clubs, Public Institutions, etc.; No. 57 for Meat Markets, No. 64 for Grocers; No. 71 for Florists.

McCray Refrigerator Co., 703 Mill St., Kendallville, Ind., U. S. A.

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Dressers, Suites, Chiffoniers, Dressing Tables and Hall Trees

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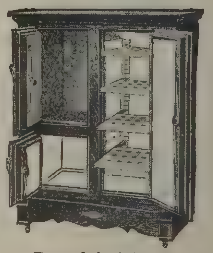
Grand Rapids, Mich., U. S. A.

The Leonard Cleanable Refrigerators

Freely acknowledged to be the best in the world
Made in Grand Rapids, Mich., U. S. A.

Four Doors.



Porcelain Lined.

Eight walls to save the ice. Air-tight locks. Sliding adjustable shelves, and many other improvements. Outside cases, oak or ash, with quarter-sawed oak panels, dark golden finish. Walls packed with Polar Felt. These prices f. o. b. New York, Boston, Philadelphia or Baltimore, boxed for export. The sizes are: First, width across the front; second, depth from front to back; third, height. All outside measurements in inches.

Four doors, zinc lined.

No.	Size		
No. 38—	Size, 38¼x22x48,	Ash	$24.00
No. 76—	“ 42x24x56,	“	29.90
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Porcelain lined. Polished,

No.	Size		
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Single Door.

Double Door.

Single door, zinc lined.

No.	Size		
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No. 71—	“ 30x19x45,	“	14.00
No. 71A—	“ 32x20x47,	“	15.50
No. 72—	“ 32x24x47,	“	17.05

Double door, zinc lined.

No.	Size		
No. 74—	Size, 35½x21x48,	Ash	$18.45
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GRAND RAPIDS REFRIGERATOR CO., Grand Rapids, Mich., U. S. A.

Moon Desk Co.

MUSKEGON MICH. U. S. A.

We
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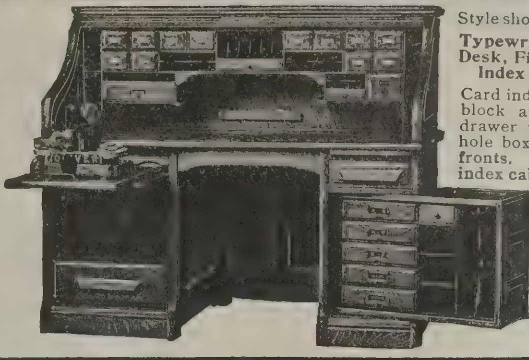
a complete
line of

ROLL TOP DESKS
FLAT TOP DESKS
TYPEWRITER DESKS
FILING CABINETS -:- TYPEWRITER STANDS -:- DIRECTORS' TABLES
BOOKKEEPERS' DESKS, ETC.

Our goods sell on their merits. Made of superior quality materials, by skilled workmen, and are finished in best manner. Give excellent satisfaction and are in big demand wherever shown. Good profits to dealers.



Style shown here is our No. 573a

Typewriter Desk, Office Desk, Filing Cabinet and Card Index System All in One

Card index drawer with follow block attachment, letter file drawer with index, 12 pigeon-hole boxes with quartered oak fronts. Swinging pedestal; provides a card index cabinet and 5-draw letter file, closes like a drawer, is locked by action of roll curtain.

Card index drawers (for swinging pedestal) with follow block attachment, 50 cents each. Typewriter attachment when in position for use, 26 inches high, standard height. 60 in. long; 32 in. wide: 50 in. high; weight 370 pounds.

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Nathan H. Hirshberg & Sons

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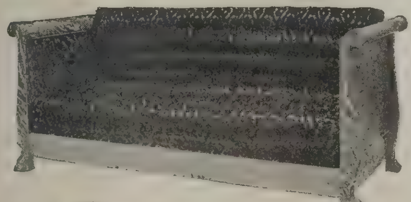

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A beautiful sofa changed instantly into a comfortable double Bed. Costs no more than an ordinary Sofa of equal style and size.

Prices range from $18.00 to $125.00. Freight paid to New York City.

Made in many handsome styles. Oak, Mahogany, and over-stuffed frames. Upholstered with genuine leather and all suitable fabric coverings.

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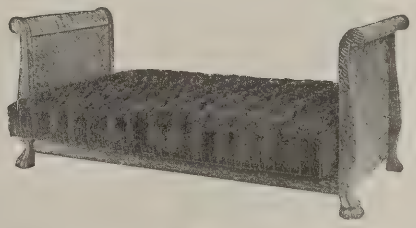

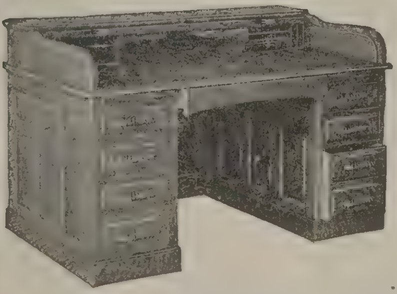

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Office Desks in the KNOCKED-DOWN FLAT (K. D. F.) WHITE save freight. Two Desks packed in one box, measuring about 22 cubic feet. Desks are made in Oak, Birch, Walnut, Cherry or Mahogany Wood.
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Hall Racks Seats and Mirrors

Ranging in price from
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Special attention given to Export Orders.

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Three Mirror Doors.

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Bedroom Suites
$15.00 to $175.00
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$8.00 to $75.00
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Our goods are made for the Export trade, and are shipped knocked down and are easily put up.

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Manufacturers of

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Our Sideboards are of genuine quartered oak.

The Chamber Suites, Odd Beds and Dressers in imitation quartered oak finish.

Finest new line ever shown now on the market. New catlogue just out, ready for mailing.

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The finest new line ever offered to the trade.
Carefully packed for export.
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FOR THE HOME, LIBRARY, SICK ROOM STUDIO, OFFICE, SCHOOL ROOM.

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THE STANDORETTE
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An Invalid's Stand, Easel, Reading Stand, Book Rest, Music Stand, Card Stand, Sewing Stand, Drawing Board, all in one handsome piece of furniture. The top can be raised or lowered, and revolves around the pedestal; automatic adjustments for tilting the top at any angle; folds compact for export.

Box containing 6, gross weight, 150 lbs. net, 100 lbs. Cubic feet, 6.

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TIP TOP TABLE

A first-class table, strong in construction, yet very light in weight. A handy table for the home, office, restaurant and summer garden. A half turn of the top places it in a vertical position, therefore occupying little space when set aside. It packs in the smallest space of any table yet designed and is specially constructed for export. The top is 30 inches in diameter; made of 5-ply veneer quartered oak.

All above articles made of steel tubing; finished, black enameled, oxidized copper or nickel-plated. Send for full particulars, prices, etc.

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Good Backing

The McCloud

20th Century Easily Adjustable

Spring-Back Chair

gives delicious comfort. You can work three times as long without fatigue, because the back can be adjusted forward or backward at any angle over the seat to give support where it is most needed, between the shoulders or at the small of the back. It is superior to all other chairs for use of typewriter, desk or piano. Made in wood, cane, leather seat or back, including high chair for standing desk, in endless variety, all combining grace and elegance never before attained.

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No. 19.—Built for Two.

Best selling line of Desks produced in America. Over 250 different styles, made in all woods and finishes.

Designed and manufactured expressly for Export Trade. All woods treated scientifically for Foreign Climates. Boxed free. Our complete catalogue (64 pages), illustrated with interesting discounts, sent free on application.

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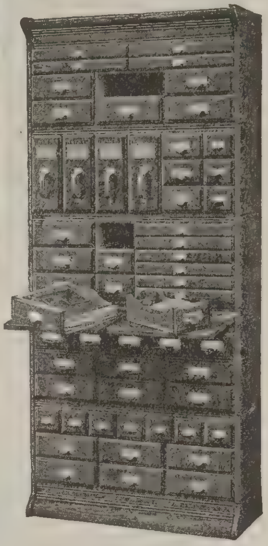
Gunn Vertical Files and Card Index Section.



The Gunn Furniture Co.

Export Department. *Grand Rapids, Mich.*

Let the Humphrey K. D. Sectional Bookcase Make Money for You

The Humphrey K. D. Sectional Bookcase has the distinctive advantage of being the ONLY K. D. case especially and exclusively designed for the export trade. Can be put together quickly and easily with no "tools but the hands." Highest quality seasoned lumber, best cabinet making and finest finish, and the only construction that allows for expansion and contraction due to damp or extremely hot climates.

ITS UNIQUE CONSTRUCTION EXPLAINED IN DETAIL IN OUR FREE LITERATURE.

While primarily designed for library use, it is also in demand for offices, jewelry stores, tailor shops, stationery stores, hardware stores, etc., as a satisfactory and inexpensive substitute for wall cases.

Its many uses afford wide possibilities for large sales and big profits to the merchant who will take hold and push. Its distinctive construction overcomes all competition—has all the advantages of any and all other cases and these exclusive features:

TEN PER CENT. LIGHTER
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If you want to get the biggest share of the trade and are interested in a plan which will enable you to make the most money from selling hastional bookcases, get into correspondence with us at once. Our case sec everything in sight beaten. Let us prove it to you. Write today for literature. Address

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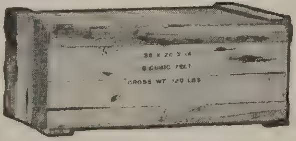

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For the Money

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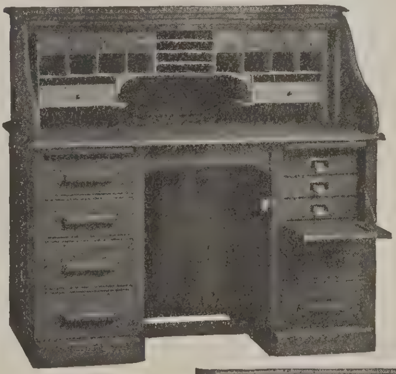
Export Our Specialty

Our patented knock-down device makes it easy to set up our desks in 10 minutes.



Positively guaranteed to be the best Desks in the world.

Prices range from $10.50 to $40.00 on Roll-Top Desks and from $7.25 to $17.50 on Flat-Top Desks. Wardrobes from $5.75 to $19.00

All Desks are packed with strong crating and delivered f. o. b. New York, Boston, Philadelphia or Baltimore. Write for catalogue.

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Cable Address, "Loubent." **Parkersburg, W. Va., U. S. A.**

Wolverine Tables
FOR
Export

We pay the freight to New York Steamers.

CATALOGUES (IN ENGLISH) UPON REQUEST.

Cadillac Cabinets
FOR
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All goods possible shipped knocked down.

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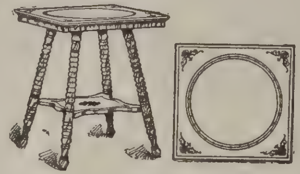

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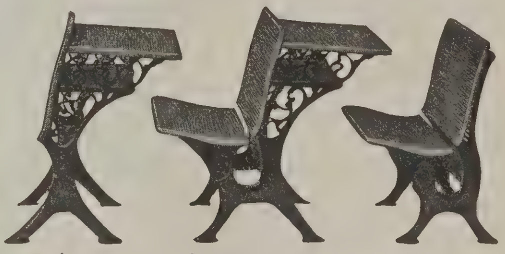
Address all communications to **Wolverine Mfg. Co., Detroit, Michigan, U. S. A.**

THE PEABODY SCHOOL FURNITURE CO.

NORTH MANCHESTER, IND., U. S. A.



Manufacturers of

SCHOOL FURNITURE

and

FOLDING CHAIRS

of every description.

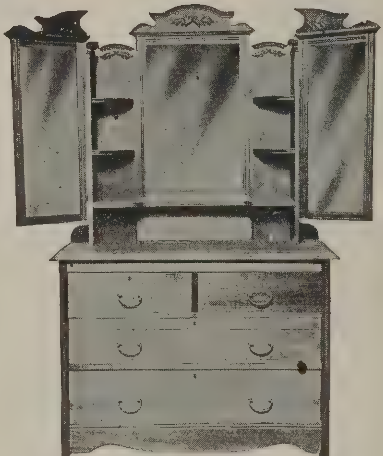
Catalogues and prices furnished upon request in Spanish and English.

Representatives wanted in each trade center of the world.

The L. C. & W. L. Cron Co.

MANUFACTURERS OF FURNITURE FOR EXPORT

Piqua, Ohio, U. S. A.



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We make a specialty of Furniture for Export, packed flat, K. D., made of well seasoned lumber and well finished.

Finished in SATIN WALNUT, IMITATION WALNUT, IMITATION MAHOGANY, OAK FINISHED GOLDEN AND SOLID BLACK WALNUT. Can be supplied in the white or unfinished wood when desired.

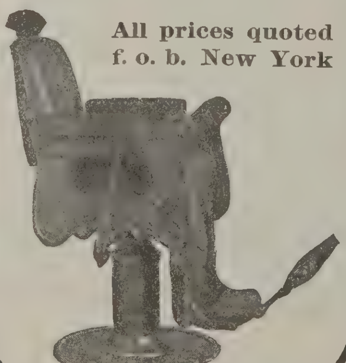
Complete Catalogue furnished on request.

Write for Special Prices and Discounts.

Hanson Barber Chairs Lead The World

We are the manufacturers of the best line of Barbers' Chairs and Barbers' Furniture in the world. Up-to-date styles, best finish and unexcelled workmanship.

Our Chairs are fully guaranteed



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LOUIS HANSON CO.

136-142 No. Curtis Street 230-238 Austin Avenue

CHICAGO, ILL., U. S. A.

Customers prefer Hanson Chairs because they are best and most comfortable.

Barbers prefer them because they bring customers.

Importers prefer them because they are the best sellers.

Responsible representatives wanted everywhere. Correspondence in all languages. Write today for our latest catalogue and export prices.

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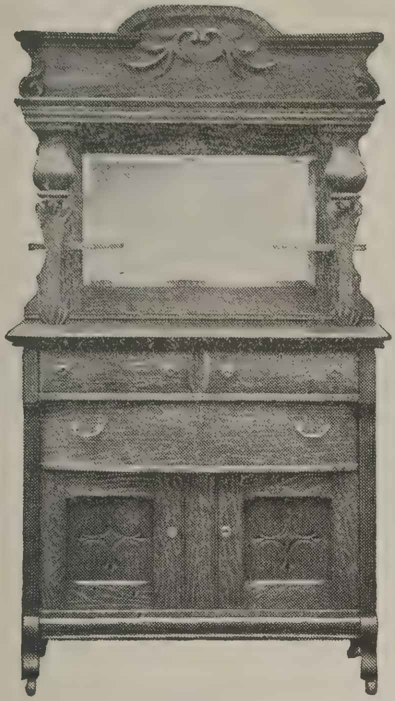

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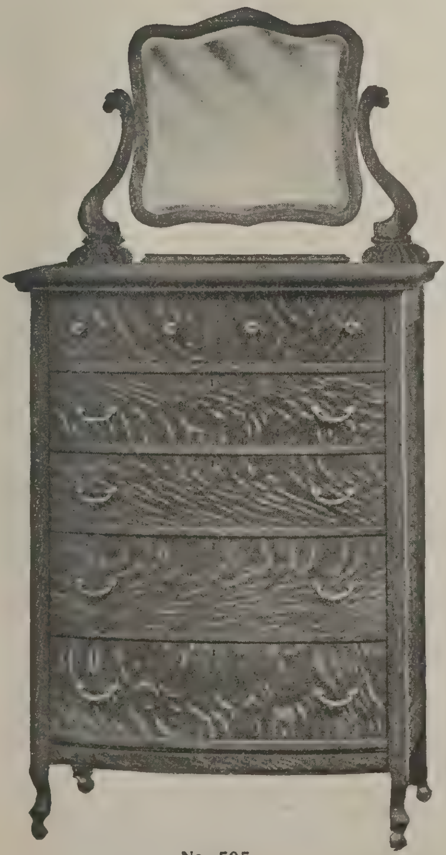
You will find our goods thoroughly adapted for exporting on account of the compact K. D. construction. The best materials and the best workmanship are employed in producing them, and a guarantee fully protects purchasers from defects of any kind. All our goods are securely packed and delivered f. o. b. New York or Philadelphia. Special export prices have been prepared and correspondence is invited.

Address Foreign Department.



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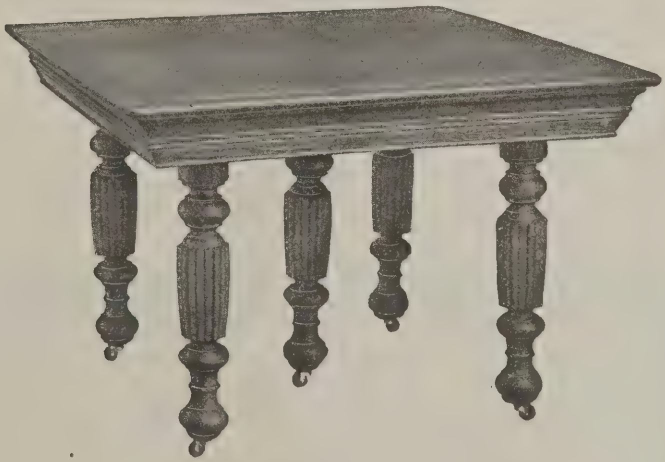

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THE PENN FURNITURE MFG. CO.
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Just the carbon paper that every user wants and that the dealer can handle at a good margin of profit. **"CROWN BRAND"** will make clearer, sharper and more intense copies than any other carbon paper on the market. We also make other brands for special requirements.

All are of the highest quality, remarkably durable and suitable for use in any climate.

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are as good as our Carbon Papers, and that means the best on the market. Made in one of the most up-to-date plants in the world especially constructed for producing Typewriter Ribbons and Carbon Papers.

We want Agents and will make Special Prices and Discounts for Export Trade. Write for catalogues and information

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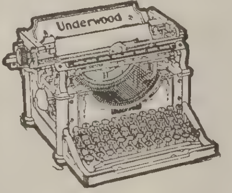

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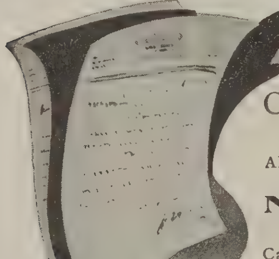

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A Brass Blotter Bath with New Equalizers

The lid being a block of mineral fibre—unbreakable, lower equalizer also fibre; bound in bottom of brass box, with brass—if dropped on floor will not break.

No Rust, Breaking, Wringing, Brushing or getting into water

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All foreign orders filled F. O. B. New York City. **Foreign Dealers Given Prompt Attention**

Write for trade discounts, prices and particulars. THIS IS A HIGH GRADE PRODUCT—The best of its kind.

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The Fox Visible Typewriter is the only Visible Typewriter that unites the durable features of the blind machines with perfect visible writing. This is done by means of the wide assembling surface in the "basket" making possible a wide typebar bearing and a heavy typebar. Perfect and permanent alignment is assured. Dealers for unoccupied territory are desired and liberal contracts are offered. English and Spanish literature on request.

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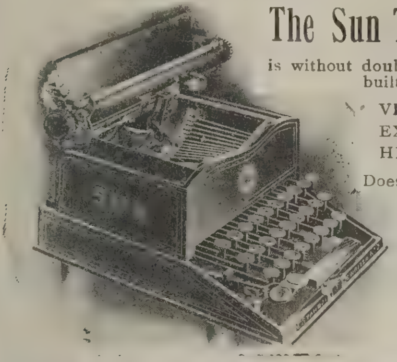
It Will Do Anything Any Typewriter Will Do

The Sun Typewriter No. 2



is without doubt the strongest and best built typewriter sold to-day.

VISIBLE WRITING.
EXTREME SPEED.
HEAVY MANIFOLDER.

Does the Fine Typewriting of the World.

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The Best Stencil Cutter. Lightest Touch.

Dealers Wanted Everywhere.

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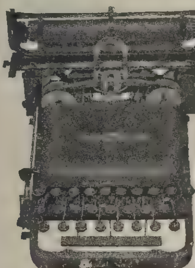


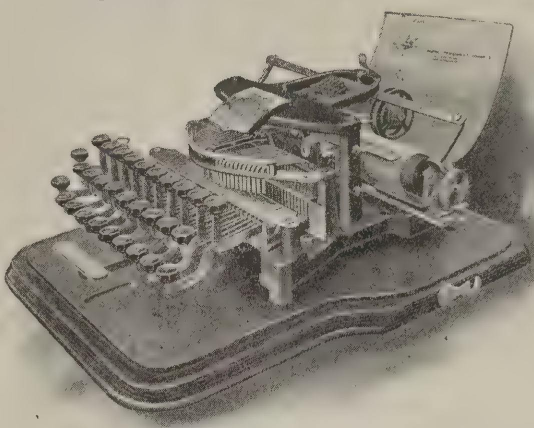
MODEL No. 8 American $50 Typewriter

The latest model of the well known **American Typewriter.** Up to date in every particular. **Two color ribbon. A pointer** indicating the exact printing point at all times; also an improved type bar bearing which makes the type bar practically indestructible. Furnished in all languages.

For seven years the American $50 Typewriter has been the standard low priced Typewriter. The key and type on one steel bar saves 1,200 parts. 15 lbs. in weight and $50 in cash. On account of its extreme simplicity it is especially adapted for export.

American Typewriter Co. 265 Broadway N. Y., U. S. A.

Postal Typewriter



The only real typewriter at a low price. It costs you 75 per cent. less than any other high grade machine and gives you standard service; universal keyboard, strong manifolding, mimeograph stencil cutting, visible writing; prints from ribbon.

Imperfect alignment impossible, because it prints from ***type wheel*** instead of individual letters on separate levers which are easily bent out of true.

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The new Model 5, illustrated above, contains many improvements over former models. Rapid action. Light touch.

Catalogue and quotations for export furnished on application.

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No. 2 Remington, $27.50 or £5.13.2.

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These typewriters should not be compared with fixed up Second Hand machines offered by many dealers. The typewriters we offer have actually been Re-Built in our own factory. We take them apart, re-nickel and replace all worn parts, including type and platen, with new ones. Result is practically a new typewriter that will do the work as well as a new machine that would cost $97.50. We make shipments through commission houses or direct to you by express when cash accompanies order. Send us duplicate when you order through commission houses to avoid mistakes. Liberal discount to agents or dealers on three or more machines. Covers $2.50 extra. Write for catalog and price list of other makes.

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REFERENCES: R. G. Dun & Co. and Corn Exchange Bank, New York.

No. 3 Oliver, $52.50. or 10£ 16s.

Not $100—$125;

$60

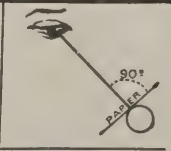
Double Value at half Price. Possible because of Large Production.

TRIUMPH

Simple. Durable. Light Touch. Quick Action. Perfect Alignment. Superior Construction. Scientific Mechanism. In every respect a Complete, Modern, Standard Machine.

The only PERFECT VISIBLE Typewriter

Every letter, from the first to the last, immediately visible at the Only Correct Angle (90°) to the Eye. No bar, no type, no ribbon, nothing obstructs the view.



Instantly Exchangeable Platen

Cylinder can be removed and replaced by a new one in a moment without disturbing work in the machine. 1 Triumph—2 Typewriters.

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Can be regulated by anyone, no experience necessary. Strong and simple. Not likely to get out of order. The best and cheapest machine for export.

All Essential Improvements. Those Unnecessary Left Out.

84 Characters. Foreign Letters. Accents on Dead Keys (print over letter without moving carriage). Writes 90 letters in one line. Takes paper 9½ in. (25 cm.) wide. Marginal Stops. Locks Automatically. Ribbon Switch. Signal Bell. Reduced Noise. Elegant Finish. Light Weight, 19 lbs. (8½ kilos).

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Will make Crayon bust enlargement, size 16x20 inches, from any photograph, finest grade, for $3 gold. Will send picture by mail, postage prepaid. Write quick for Agency.

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MANUFACTURED IN ALL LANGUAGES FOR EXPORT

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FOR QUICK AND NEAT PRINTING OF

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Sole Agents wanted for France, Italy, Scandinavia and Russia.

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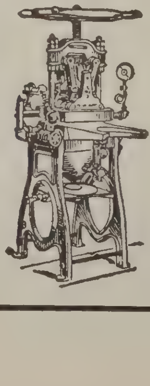

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if you will buy one of our RUBBER STAMP MAKING OUTFITS. Our Vulcanizers are the best in the world, and are used in all the large rubber stamp houses.

We also Engrave all kinds of Steel Dies, Coins and Memorial Plates.

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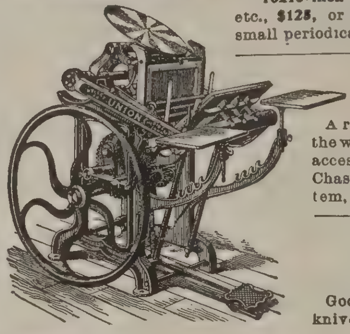
Hand presses, easy to use by man or boy. Typesetting and good printing easy by full printed instructions sent.

5x8-inch Press, for cards, circulars, etc., with 7 styles of type, ink, etc., **$40.00.**

10x15-inch Press, with 10 styles of type, ink, etc., **$125,** or with more type, rules, etc., for small periodical, **$200.**



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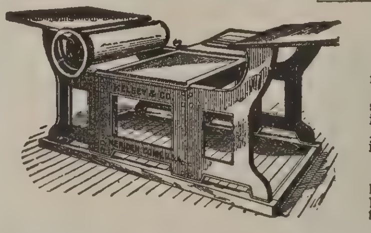

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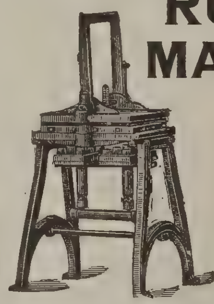
For newspaper and large announcements. Bed, 29x43 inches. Price, $500. Includes 300 pounds small type, 25 fonts assorted types, inks, rules, etc., for newspaper. All our outfits complete, ready for instant use.

Catalogues, free by mail, of presses, types for all languages, paper, cards, etc. Write to our factory near New York.

KELSEY & CO., Meriden, Conn., U.S.A.



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Our "NEW YORK" Automatic Rubber Stamp Vulcanizers and Manufacturing Outfits are practical in every detail. Complete Outfits cost from $25 to $100. Anybody can make perfect stamps after reading the printed instructions we furnish free with each Outfit

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Highest Standard of Accuracy Guaranteed

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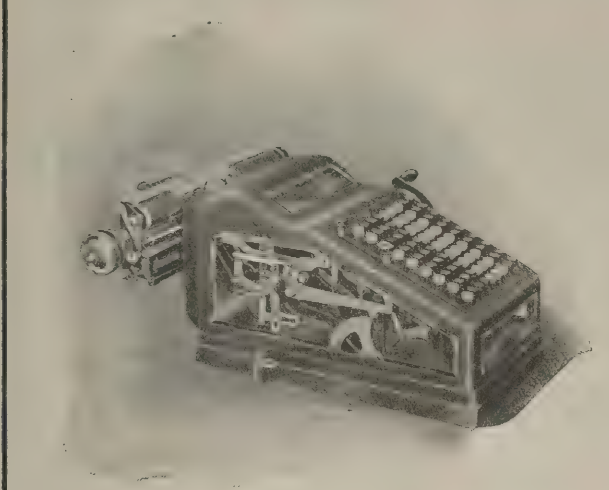

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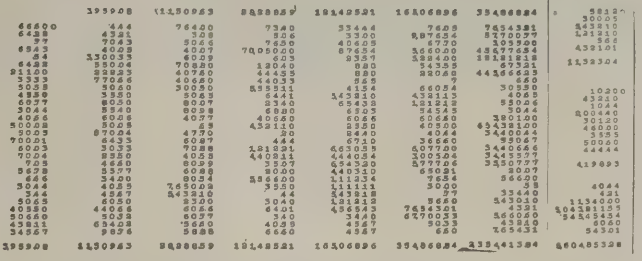

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The Adder Machine Company

WILKES-BARRE, PA., U. S. A.

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that of all the adding and computing machines manufactured in the United States the

LOCKE ADDER

IS THE BEST

Rapid, Simple, Handy, Practical, Durable. All Metal. Adds, Subtracts, etc.

Capacity, 999,999,999

Its ingenious plan avoids all use of complicated, costly mechanism and places it within the reach of all. Two styles, **$5.00** and **$10.00.** Write to-day for Export Proposition. We want agents and dealers to represent us everywhere.

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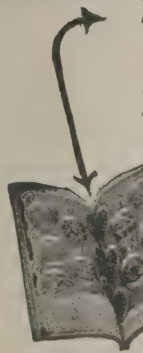
Established 1864

MANUFACTURERS OF

Safes and Locks

Correspondence solicited.

A Magnificent Illustrated Watch and Jewelry Catalogue



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DIAMONDS, WATCHES

Solid Silver, Cut Glass, Clocks, Solid and Gold Filled Jewelry, Stationery, etc.

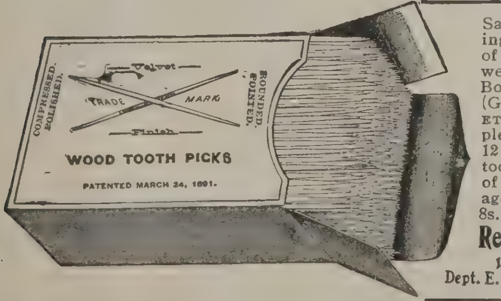
You can see more to select from in 15 minutes than you could in 4 hours' shopping.

PRICES LOWER THAN IN ANY RETAIL STORE IN THE WORLD

Sent free. Write your name on a postal.

JOHN C. PIERIK & CO.

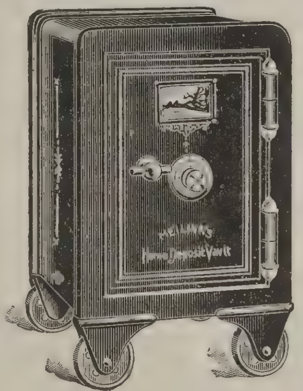
102 Pierik Building, SPRINGFIELD, ILLINOIS, U. S. A.



Sample case containing 9 different kinds of our tooth picks, weight, 60 lbs. F.O.B. Boston, £2 10s., $12.50 (Gold). SAMPLE PACKET.—Containing complete assortment of 12 different kinds of tooth picks, one box of each kind Postage paid, $2.00 (Gold), 8s.

Rex Tooth Pick Co.

176 Federal Street.
Dept. E. Boston, Mass., U.S.A.



We have Safes from $10.00 up.

Special New Line for Export

We offer many points of advantage to the foreign buyer of fireproof safes in our NEW LINE.

MEILINK'S HOME DEPOSIT VAULTS

comprise a line of 11 styles of small safes for the home, doctor, lawyer and small business.

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comprise a line of six styles of office safes, 4-inch walls, extra deep for large books and vertical files.

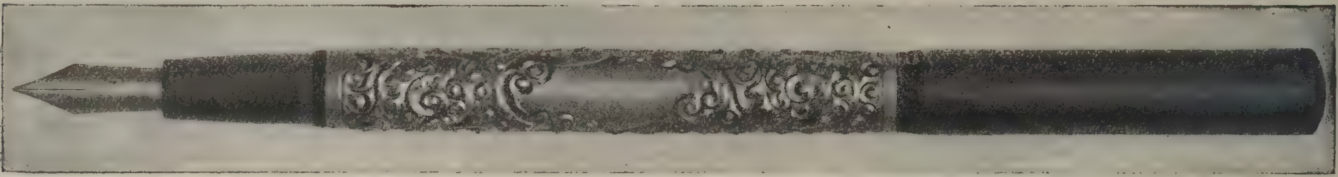
SPECIAL POINTS.—These safes are half the weight of any other reliable maker, with same inside capacity. The difference is the method of fireproofing. The material used is pure fibre asbestos set with cement, which is only one-sixth the weight of any concrete or cement filled safes. Moisture, corrosion and rusting, difficulties common to all other makers, especially in small sizes, we GUARANTEE POSITIVELY AGAINST. In countries where duties are specific you can save 25 per cent., besides a great saving in transportation from New York. OUR PRICES are favorable. Finish, construction, locks and bolt work are equal to the best goods on the market in every particular.

Special Export Catalogue in Spanish on our New Line will be ready in October.

THE MEILINK MANUFACTURING COMPANY

Toledo, Ohio, U. S. A.

THE PAUL E. WIRT FOUNTAIN PEN



Illustrating Catalogue No. 65—No. 4 Pen—Gold Mounted Holder. Price $7.50.

Bear in mind that the "Paul E. Wirt" was the first fountain pen manufactured in the world. Its reputation has stood the test of thirty years. Our long experience in making fountain pens enables us to manufacture every conceivable variety. Over 100 styles to choose from. Send for catalogue and our terms and export discounts. It will surprise you to learn what we have to offer.

Address THE PAUL E. WIRT FOUNTAIN PEN, Bloomsburg, Penn., U. S. A.

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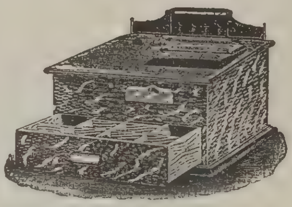

No. 85.

The only machine that gives you an absolutely correct record of EVERY transaction from the time your store opens until it closes, and making it out of the question for your cash NOT to balance.

Write for Circular and Prices to

HOUGH CASH RECORDER CO.,
INDIAN ORCHARD, MASS. U. S. A.

DO YOU

cater to a class of trade who would appreciate the *comfort* and *convenience* of a *thoroughly* modern fountain pen—one possessing the *latest* features in *filling* and *feeding*—of *proven worth, not* experimental in any part, but *genuinely* good from cap to pen point?

MODERN FOUNTAIN PENS

Automatic Self-Filling or Middle Joint are pens of modern merit, possessing all of these features.
Modern retail prices: $2.00 to $35.00 each.

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The Lock Has 32 Combinations,

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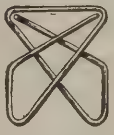

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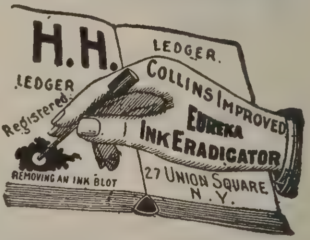

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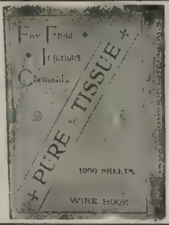

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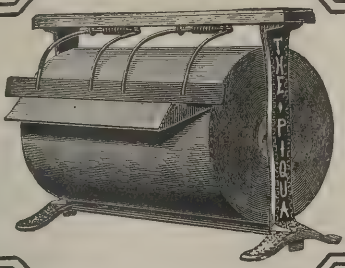

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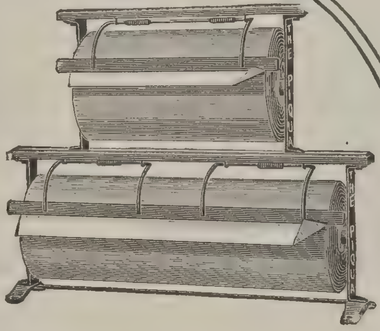

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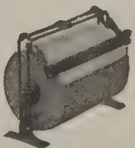

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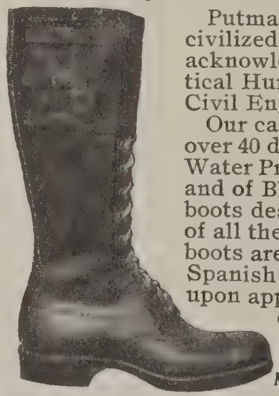

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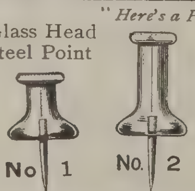

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For Ladies' and Children's Shoes, and all other Articles of Leather

A liquid blacking of unrivalled quality. Gives a brilliant polish without rubbing. Does not soil the dress and makes the shoes soft and pliable and like new.

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Adapted Especially for Gentlemen's Shoes and Heavy Shoes of Ladies and Children

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BLACK SHOES, RUBBERS, HARNESSES, Etc.
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Sole Makers of the Celebrated

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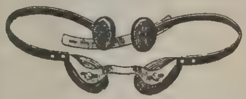

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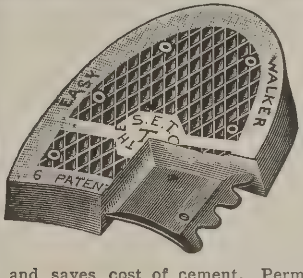

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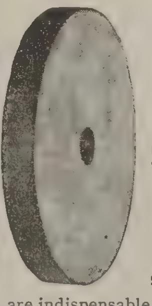

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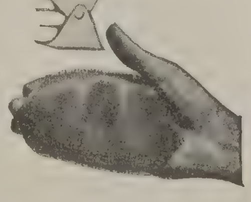
are indispensable for putting a high polish on Edge Tools, Cutlery, Machinery and metal of any kind, or for removing rust spots and cleaning steel of all kinds. Will not mar or scratch the surface. Contains some rubber, which gives that resilient effect, thus forming a cushion. Made containing emery or carborundum from 20 to 180. Will outwear all other makes of emery wheels. Use dry or with water. Keep from oil. Trade solicited in quantity lots.



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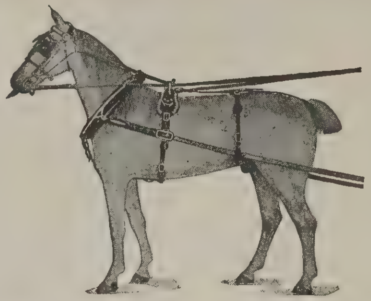

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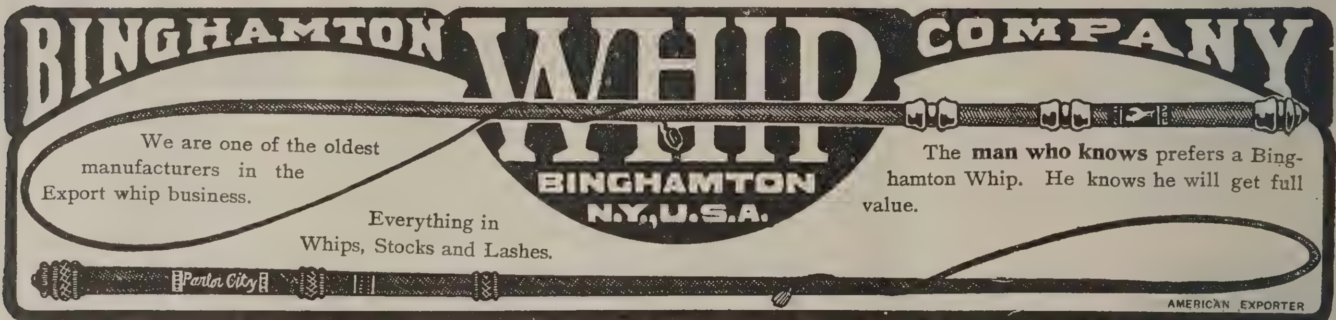

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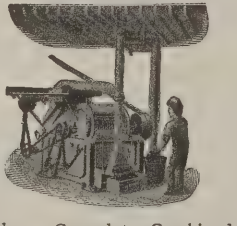

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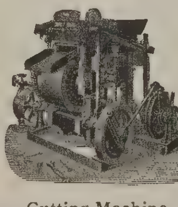

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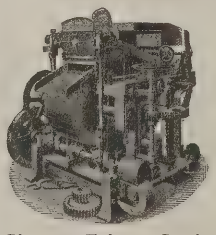

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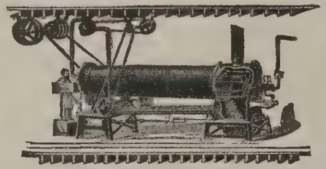

Perfection Steam Dryer.

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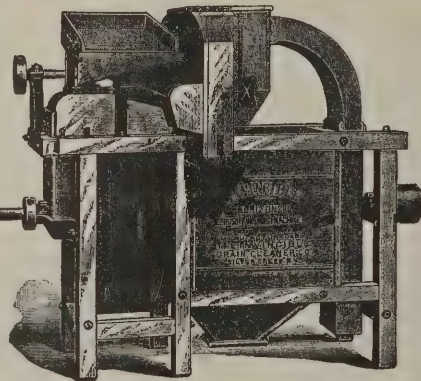
IMPORTANT TO MILLERS EVERYWHERE.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CLEANS CLEANING INVINCIBLE CLEANERS TRADE MARK

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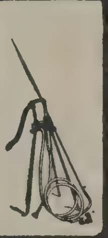
DAYTON SPRAYING AND WHITEWASHING MACHINES



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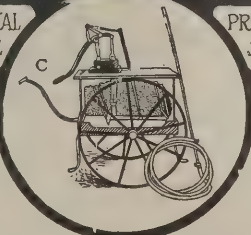

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Manufacturers of the celebrated

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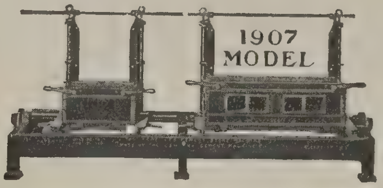
Face Down—Wet Mixture

The HERCULES



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The Fastest, Simplest, Strongest Concrete Block Machine Made

Made on Hercules.

The Hercules is known as the real concrete block maker.

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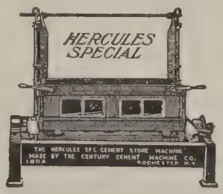

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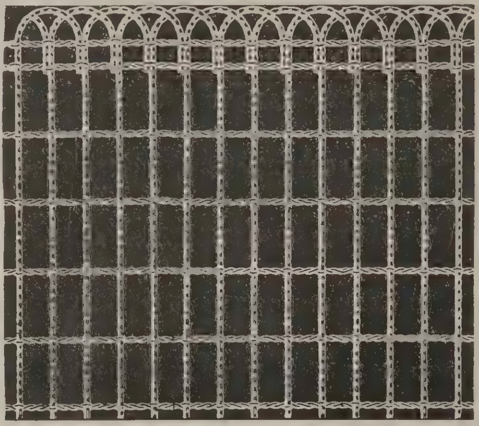

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We manufacture a complete and well assorted line of

Ornamental Wire Fencing *and* Gates

in heights from two to six feet, suitable for use with wood posts or with any of our exclusive designs of Steel Posts.

Our Fences are especially adapted for Lawns, Parks and Cemeteries.

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We also manufacture FENCE WEAVING MACHINERY.

We offer good propositions to reliable Agencies.

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Largest output in the world of Ornamental Wire Fencing and Gates.

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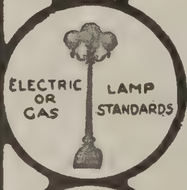

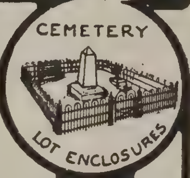

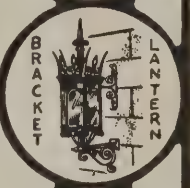

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200 DESIGNS
For Public and Private Grounds

We want a hustling representative in each trade center of the world to sell our line.

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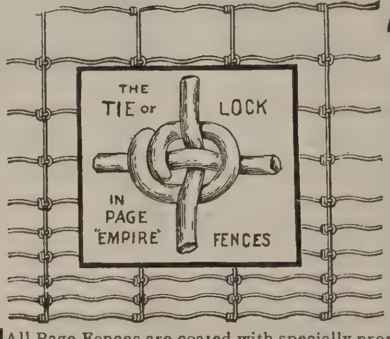
OF EVERY DESCRIPTION.

We show some of our specialties, others are: Lawn and Drinking Fountains, Hitching Posts, Stable Fixtures, Window Guards, Stoop and Office Railings, Safes, Jail and Prison Work, Steel Vault Doors and Linings for Banks, Public Buildings, etc Lawn Ornaments, Tree Guards, Park and Cemetery Arches, etc.

Make your wants known; we can supply you.

Write today for Catalogue No. 105-G.

THE STEWART IRON WORKS COMPANY
CINCINNATI, OHIO, U.S.A.
"The Worlds Greatest Iron Fence Works"



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(The White Brand)

CANADIAN PAGE WIRE FENCING comprises complete lines of Ranch and Farm Fences, Steel Gates, Lawn Fences, etc.

Note well our points of superiority: Our High Carbon Steel Wire is 50 percent. stronger than the wire used in other fences. Page Wire is **COILED** from end to end—not crimped. All Page Fences are coated with specially prepared **WHITE PAINT.** Page Fences require one-third less posts because of their elasticity. Write for catalogue and export discounts.

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PLOW MAKERS FOR OVER FORTY YEARS

94 AND 95 PLOW

REVERSIBLE SLIP POINT and SHARE.

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The Best and the Most Perfect CHILLED PLOW made. **350** Different Styles and Kinds. Over **600** men steadily employed in their manufacture. Sold in every section of the world where civilization reigns and good farming is desired. WARRANTED not the equal, but THE BEST.

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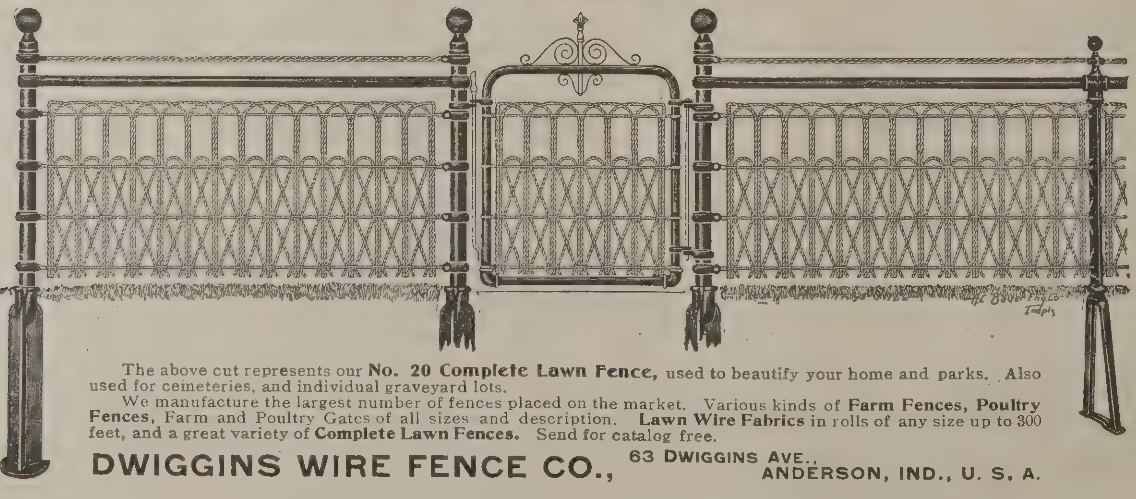

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The above cut represents our **No. 20 Complete Lawn Fence,** used to beautify your home and parks. Also used for cemeteries, and individual graveyard lots.

We manufacture the largest number of fences placed on the market. Various kinds of **Farm Fences, Poultry Fences,** Farm and Poultry Gates of all sizes and description. **Lawn Wire Fabrics** in rolls of any size up to 300 feet, and a great variety of **Complete Lawn Fences.** Send for catalog free.

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are correctly designed in every detail. Ball bearings make them very light running and highly efficient. Thorough galvanizing after completion insures great durability. Made in all sizes and capacities for pumping water, irrigation, power, and various other purposes.

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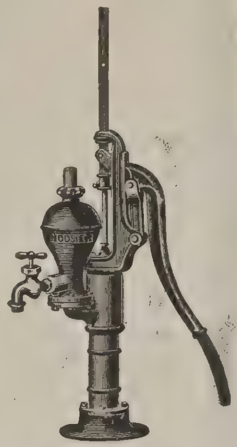

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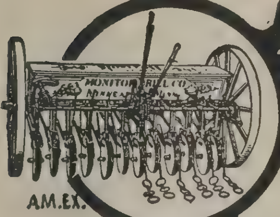

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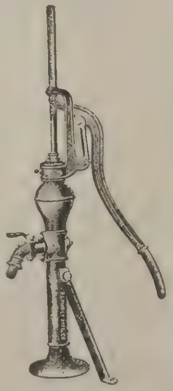

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We would like you to have our book on Wind Motors. It tells you all about the

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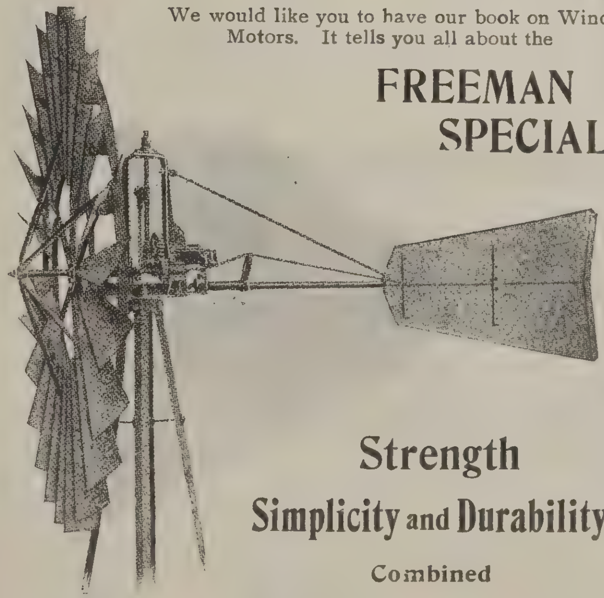

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Simplicity and Durability
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Made in 6, 8, 10, 12, 14 and 16 foot sizes. Four post angle steel towers to suit each size mill. The 8 foot size condenses to 9½ cubic feet. Gross weight 415 lbs.; other sizes proportionally.

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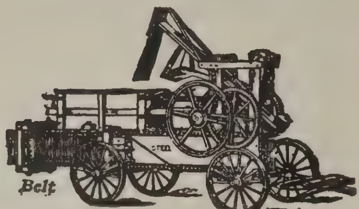

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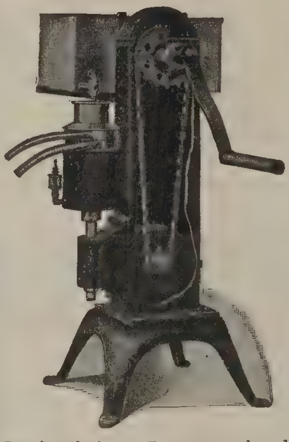

Sectional view. Gear case closed

Shipping weight, 240 lbs.

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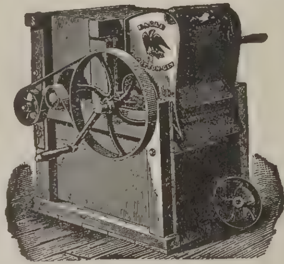
Gear case open.

Cable Address: STANSEPCO.
Code used: Lieber's.



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Eagle Cotton Gins

These Gins enjoy a *better reputation than any others of their class in existence,* and are *preferred* to all others made, on account of their *strength, simplicity, durability,* the amount and *excellence* of the work they accomplish, and the *rapidity* of their operation. For further details Illustrated Catalogues will be furnished on application.

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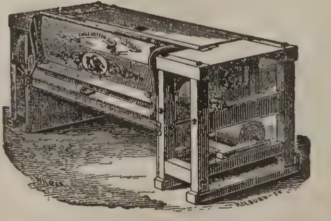
Successors to EAGLE COTTON GIN CO. **BRIDGEWATER, MASS., U. S. A.**



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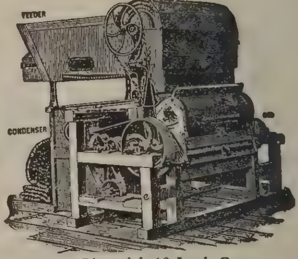
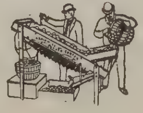


Power Gin with 10-Inch Saws, with Feeder and Condenser.

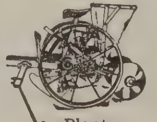
Cutter



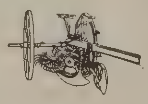
Sorter

4 Row Sprayer

ASPINWALL POTATO MACHINERY



Planter



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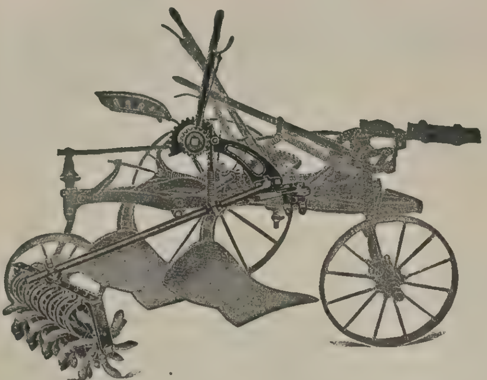

The Rotary Harrow Attachment

For Sulky and Gang Plows

is continually growing in favor wherever introduced. It has been subjected to nearly all the soil conditions in the United States and Canada, and in every instance has given splendid satisfaction.

THE ATTACHMENT saves 100 per cent. in time and labor when used in connection with the plow, and under normal conditions of the soil no additional disking or harrowing is necessary before planting.

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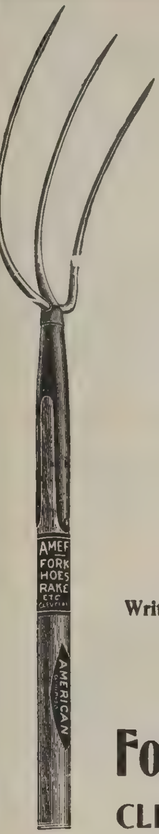

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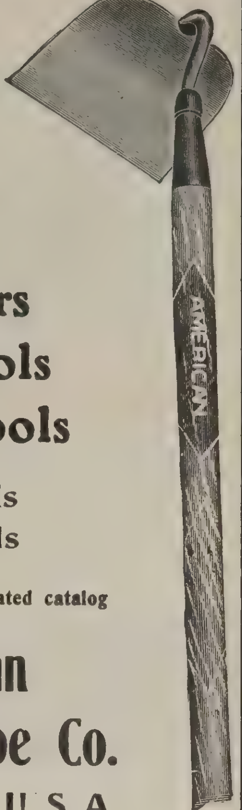

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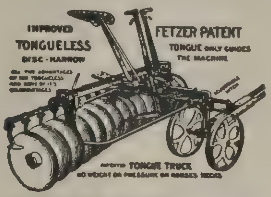
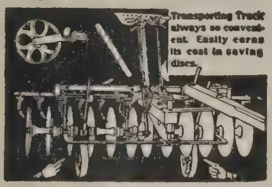
Export Office: 11 Broadway, New York


IMPROVED
TONGUELESS
DISC-HARROW
FETZER PATENT
TONGUE ONLY GUIDES THE MACHINE
TONGUE TRUCK
NO WEIGHT OR PRESSURE ON HORSES NECKS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Modern Grain Drills

Seeding Machinery
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Disc Harrows with Transport Truck.
Transplanters for { Tobacco, Cabbages, Tomatoes, etc.
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Capital.......$1,000,000

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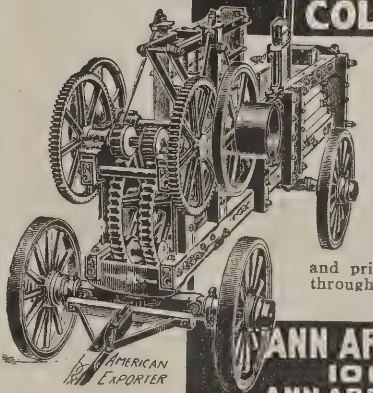

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A complete, simple and dependable COMBINED hill and drill seeding machine, with attachments for quickly and easily changing it to a double and single wheel Plow, Harrow, Rake, Weeder, Mulcher, Hoe, Hiller, Cultivator or Pulverizer.

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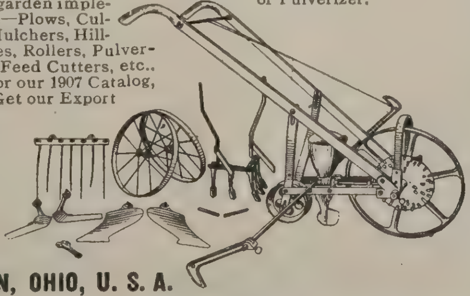

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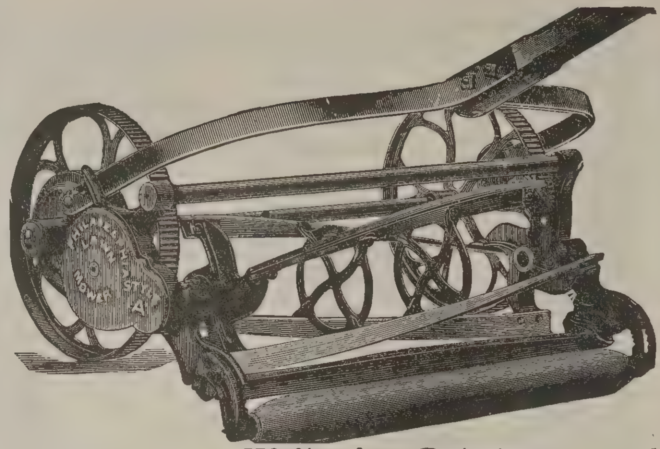

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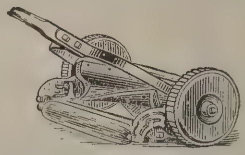

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Made in 17 Styles of Hand and 5 of Horse Mowers

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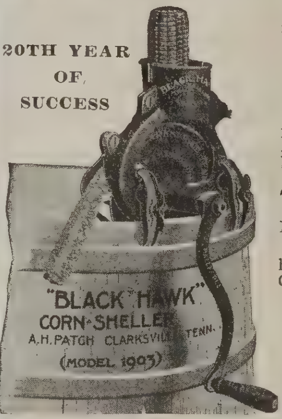

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Weight, 15 lbs. Capacity, 8 to 14 bushels per hour. Largely of ***Malleable Iron.*** All bearings chilled. Attached to any box ***Instantly by Clamps.***

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Order direct or through any reliable Export Commission House.

Beware of Imitations. Insist on having Patch's Patent "Black Hawk" Corn Sheller. All others are ***Frauds.***

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DIXON.
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Manufacturers of

HAND and PONY Mowers

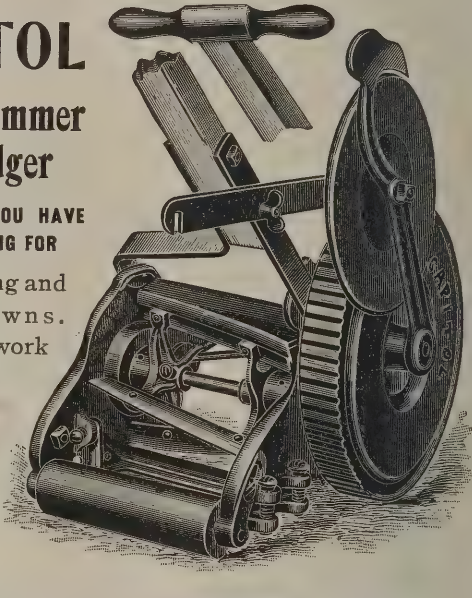
ALSO MARINE GASOLINE ENGINES
2 to 3 H. P.

The mower that will kill all the weeds in your lawn. If you keep the weeds cut so they do not go to seed and cut your grass without breaking the small feeders of roots, the grass will become thick and the weeds will disappear.

The Clipper will do it. Ask your dealer for them or drop us a line.

CAPITOL

Lawn Trimmer and Edger



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For trimming and edging lawns. Will do the work of four men with shears. Specially adapted for cemeteries and parks.

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This is the only practical tool of its kind in existence, and thousands of dealers are finding it a steady seller, paying them a good profit.

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The Ideal Lawn Mower Grinder

will grind a Lawn Mower perfectly in 15 minutes—makes every blade keen, with just the right angle and a perfect clearance—and is destined to revolutionize the whole business. We can't begin to enumerate its advantages here, but the rest of the story is yours for the asking. Don't be a back number. Order one to-day and you will have no competition in this line.

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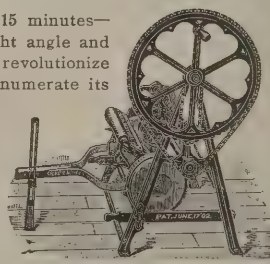

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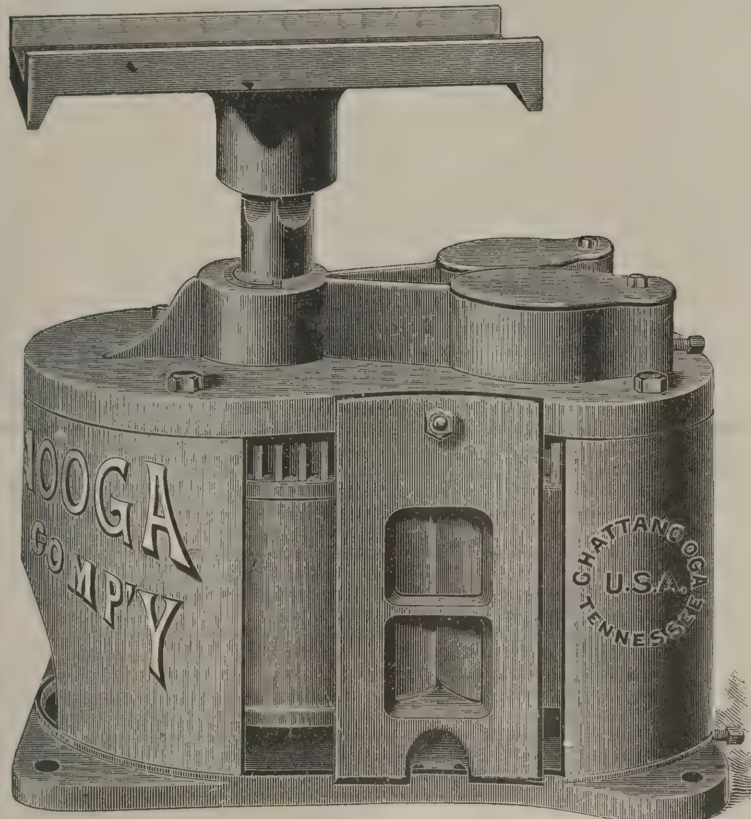

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Horse and Steam Power.
Strongest and Best Cane Mills Made.
Especially designed for tropical cane.

Sugar Kettles

20 to 150 Gallons

Write for complete catalogue.

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ENDORSED BY FORTY-THREE AGRICULTURAL COLLEGES

Used by Many Thousand Stock Growers

DISINFECTANT
LICE KILLER
MANGE CURE
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ZENOLEUM

ABSOLUTELY NOT POISONOUS

For Cattle, Horses, Hogs, Sheep and Poultry

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DEALERS WANTED—We want the best dealers in every town to sell **Zenoleum.** It gives a fine profit and sells every day in the year. **Zenoleum** will surely please your customers; they will want more.

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We supply all dealers with a handsome window display, showing animals in colors. We also supply advertising circulars to give to your customers.

Write to us for full information

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Material, Mechanical Construction and Workmanship

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is of the finest quality.

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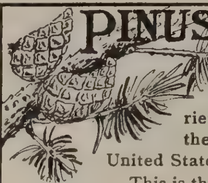

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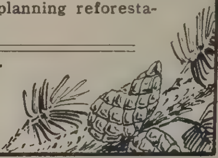

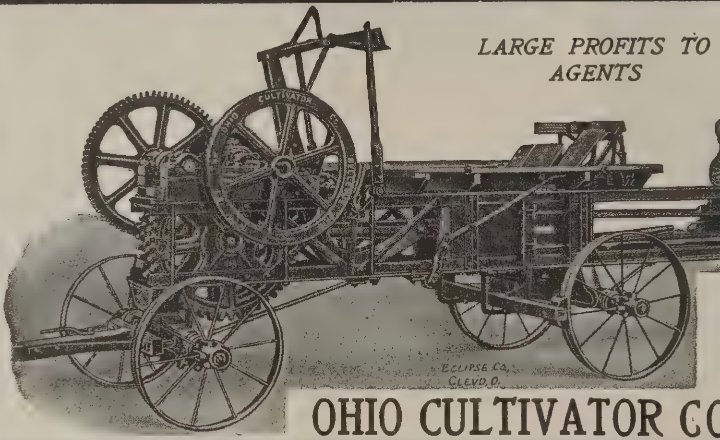
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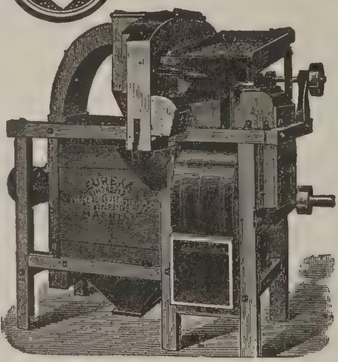

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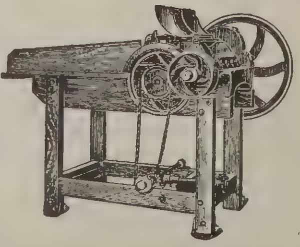

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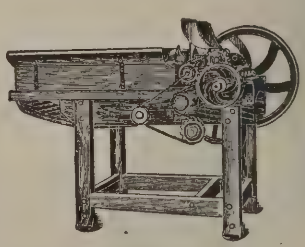

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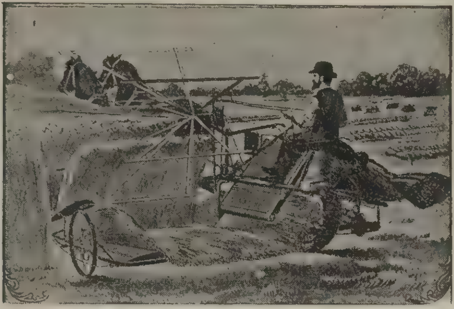

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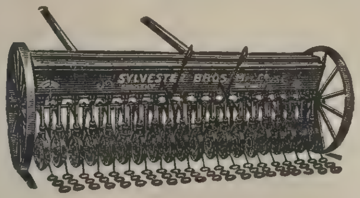
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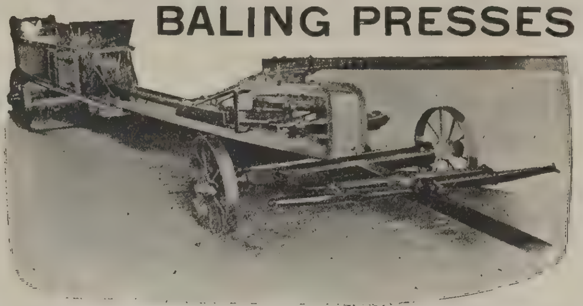

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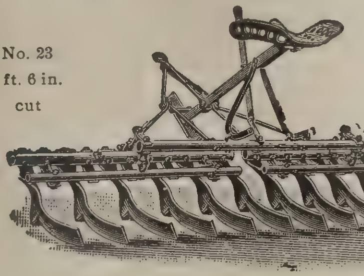

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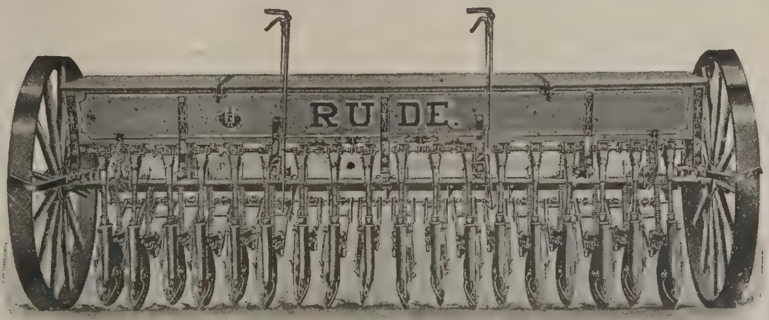

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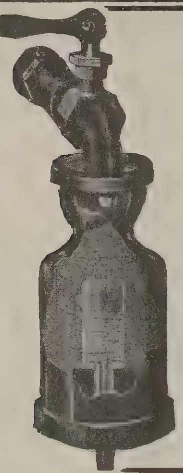

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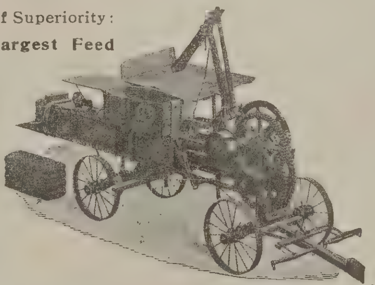

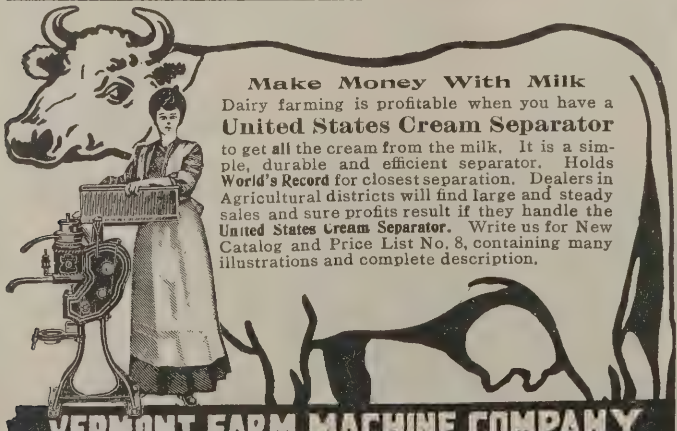

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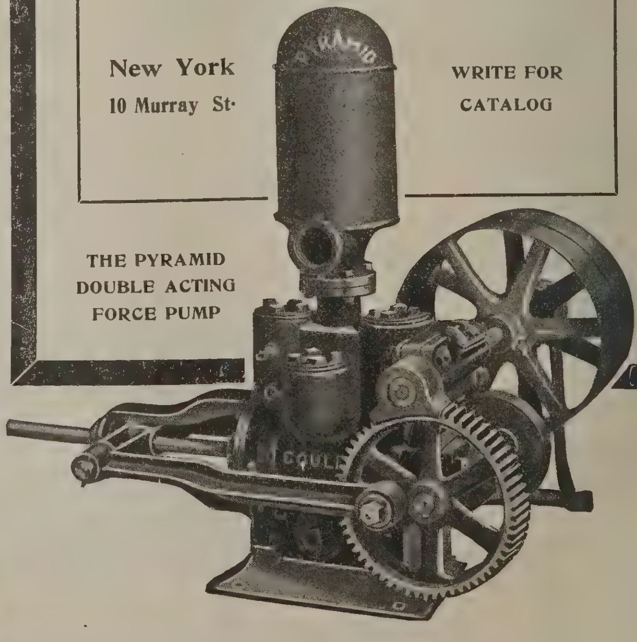

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℄ An export bulletin and guide for American manufacturers engaged in or seeking foreign trade.

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Advertising rates submitted on application.

THE PARTING OF THE WAYS.

Nations rise and fall; religions are persecuted, persevere and conquer; industrial movements alter the needs and means of commerce, yet human nature remains ever the same—unchanged through all the centuries.

The ancient fable of the grasshopper and the ant is as pertinent and valuable to man today as it was in an earlier civilization when books were for the few and illiteracy by no means unfashionable.

It will be recalled that the grasshopper scorned the example of the thrifty ant when abundance smiled everywhere and there was more than aplenty to be had without labor or search.

Winter came, however, and smiling plenty disappeared as by magic. Sad then was the plight of the grasshopper, since she had made no provision for any state of affairs save one offering prosperous supply.

Too late came her regret that she had heeded neither the warning nor the example of the ant.

The twentieth century has its full quota of human grasshoppers of many types and classes. That which comes most often to our attention is the manufacturer who deliberately refuses to lay up a store of foreign connections against the day, which is bound to come, when local disturbance, be it financial, political or what not, will for a time blight the abundance of home demand which he has been enjoying.

He declines to make the slightest effort to secure foreign business on the plea that he is full up with home orders or can make more money supplying domestic business.

We know of several cases where prominent and supposedly sane American manufacturers have let inquiries from leading foreign houses go unanswered, refused orders from the most substantial firms except at absurd terms—in brief, shown neither courtesy, enterprise nor common sense when dealing with foreign prospects.

In gratifying contrast to the penny-wise, pound-foolish policy which has made these firms blind to every market save that nearest and easiest to hand is that of one Western manufacturer of our acquaintance who started a campaign for foreign business two years before he desired that business. He had more than enough home orders to keep his factory fully occupied, and was actually filling export orders before he really wanted them, in order that he might be establishing a firm foreign business and reputation for future needs. Many of his competitors today are face to face with overproduction, whereas his profits will remain stable and normal, whatever local financial conditions may be.

This is, obviously, an extreme example, and only a company with ample capital, a firm policy and long established business could properly adopt such a course. But it is such a shining light in the murky atmosphere of indifference to foreign possibilities that it deserves the heartiest commendation.

We would be the last to urge such a radical course on every manufacturer. We have, however, constantly urged all manufacturers to make serious efforts to secure more foreign business, realizing not only the immediate profits to be made in the field but the ultimate necessity of cultivating it.

Necessity is not a pleasant word, perhaps, but it is only an ostrich-like mind which is blind to the fact that American prosperity will depend more and more upon our success abroad, and that a nation which has, by its own unaided efforts, raised itself in a bare century to the manufacturing level, or higher, of England and Germany must compete more actively with them in supplying the needs of that vast portion of the world which is unsuited to the work of manufacturing first-class goods.

Stripped of their trade with colonial possessions, the Far East and South America, England and Germany would long ago have faced poverty, misery and starvation, and either the United States must make an active bid for more foreign business or undergo a wasteful and painful commercial and financial readjustment. Hapilly there is room for all three of us, but if we are laggard these other two nations will fatten at our expense.

The bounden duty of the American manufacturer today is to co-operate with the nations of the world that all may prosper, ours with the rest. Let us show the foreigner that we are no longer indifferent to his wishes, his commercial customs and his desires as to adaptations suitable to the markets.

SECRETARY STRAUS ISSUES CALL.

The Secretary of Commerce and Labor, Oscar S. Straus, has issued a call for a meeting of representatives of the various boards of trade, chambers of commerce and other commercial organizations, to be held at the Department Building in Washington, December 5, to discuss especially methods by which his department may assist in promoting export trade.

Secretary Straus feels that the department should take an active part in the industrial situation and he is striving to bring it up to a high state of efficiency.

Under the direction of the Secretary, N. I. Stone, who is officially termed the "Tariff Expert of the Department of Commerce and Labor," has prepared a pamphlet upon the promotion of foreign commerce in Europe and the United States, which is being sent out to the officers of the organizations.

In this pamphlet Mr. Stone discusses the functions of the department and makes comparisons with the functions performed by similar departments in European governments. In Germany, for instance, the department has five councilors whose duty is to study foreign commerce. Under these councilors are bureaus and divisions charged with the collection and publication of information relating to various topics of interest to the country's commerce.

These councilors are not like our special agents and clerks who are charged with a large mass of routine work. They are relieved of all such work and have full opportunity for the work of gathering and dispensing information and ideas. Consequently they are the ones consulted when a tariff bill, for instance, comes up in the Reichstag or when a commercial treaty with some foreign country comes up for consideration in the Foreign Office.

Both in England and Germany the chief work of the Department of Commerce and Labor is furnishing information and advice to the business world. Through the business of manufactures our department has been trying to do something like this, and it was to this end that the daily publication of the consular and trade reports was instituted.

It is suggested that since much of the information published in the daily consular and trade reports comes from the Department of State, it would be well to have a joint committee appointed by the Secretary of Commerce and Labor and the Secretary of State to work out a practicable scheme for better co-operation between the two departments.

Mr. Stone closes his pamphlet with a statement of the object of the new movement to be inaugurated by Secretary Straus. He says:

"The different lines of work suggested here are all dictated by one main idea—the necessity of adopting a definite policy which should stamp the work and character of the Department of Commerce and Labor and make it a distinct, tangible entity in the minds of the people as an institution for the promotion of the commerce of the United States."

VALUE OF FOREIGN COINS IN UNITED STATES GOLD.

United States Customs Standard. Proclaimed by Law October 1, 1907.

Argentine Republic—peso	.965
Austria—crown	.203
Belgium—franc	.193
Bolivia—boliviano	.499
Brazil—milreis	.546
British Possessions, N. A.—dollar	1.00
Guatemala—peso	.499
Honduras—peso	.499
Nicaragua—peso	.499
Salvador—peso	.499
Chili—peso	.365
China, Chefoo—tael	.782
China, Haikwan—tael	.832
China, Shanghai—tael	.747
China, Tientsin—tael	.792
China, British—dollar	.538
China, Hong Kong—dollar	.538
China, Mexican Chopped—dollar	.542
Colombia—dollar	1.00
Denmark—crown	.268
Ecuador—sucre	.487
Egypt—pound	4.943
France—franc	.193
Finland—mark	.193
Great Britain—pound	4.866½
Greece—drachma	.193
German Empire—mark	.238
Hayti—gourde	.965
India—rupee	.3244⅓
Italy—lira	.193
Japan—yen, gold	.498
Liberia—dollar	1.00
Mexico—dollar	.498
Netherlands—florin	.402
Newfoundland—dollar	1.014
Norway—crown	.268
Panama—balboa	1.00
Persia—kran	.092
Peru—sol	.487
Philippine Islands—peso	.500
Portugal—milreis	1.080
Russia—ruble, gold	.515
Spain—peseta	.193
Sweden—crown	.268
Switzerland—franc	.193
Turkey—piaster	.044
Uruguay—peso	1.034
Venezuela—bolivar	.193

Note—The value of all foreign coins is subject to the fluctuations of the current rates of exchange.

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LATIN AMERICA—NOW OR NEVER.

The Great Commercial Opportunity Which Our Sister Republics Offer and the Necessity for Prompt and Intelligent Action.

BY HON. JOHN BARRETT.

An address by the director of the International Bureau of American Republics, and formerly United States Minister to Colombia, Panama and Argentina, before the Newark, N. J., Board of Trade, October 9, and the Trenton, N. J., Chamber of Commerce, October 17, 1907.

HON. JOHN BARRETT.

THE best way for the great business interests of the United States to thoroughly understand and exploit foreign markets is that organizations like chambers of commerce and boards of trade shall make a study of them and consider carefully their possibilities as described by those who are familiar with them. Do not understand from this that I pretend to be an authority, for I am only a student, and the more I study the more I realize what I have to learn. What I tell you this evening will be descriptive of one of the most important fields of foreign trade expansion that has ever been before the manufacturers and exporters of the United States.

INTERNATIONAL BUREAU OF AMERICAN REPUBLICS.

Before proceeding further, however, let me say just a word to you about the International Bureau of American Republics, often called the "Pan-American Bureau," of which I have the honor to be the director or chief administrative officer. Its great object is to promote both commerce and friendship among the American republics. It is supported by the joint contributions, pro rata of population, of the twenty-one republics of the western hemisphere. It is strictly an international organization and is not subordinate to any department of the United States Government. As its director, I have the unique distinction of being an officer of twenty-one different nations, so that you do not hear me tonight simply as an officer of the United States, but as an officer of the United States and all of our sister republics. The International Bureau was established seventeen years ago by the First Pan-American Conference which was held in Washington. A dignified and useful existence has characterized its life since then, but it has never accomplished the work originally intended, largely on account of the lack of interest of the United States and the other governments. Now a new era has dawned and the credit is due to Elihu Root, our distinguished Secretary of State. In his wonderful journey around South America he made both North and South America realize the importance of getting into closer relations of commerce and comity. I ask for the co-operation of chambers of commerce and boards of trade in making the Bureau a world-recognized, practical and useful institution.

I shall not make an academic speech tonight, but I shall endeavor to give you a few salient facts that will convince you of the importance of the Latin American countries and of their markets. We have been devoting too much time to Europe. Too large an element of our travelers visit that part of the world. We have devoted too much space in our newspapers to Asia and the Orient, although that is a very important field. We have neglected the twenty nations that are directly south of us and where we have greater responsibilities than we ever had in Europe or Asia. The great dangers, moreover, in competition and in cheap labor, which confront us in the Far East and in Europe, do not exist in Latin America. The latter field is peculiarly our own, both for geographical and political reasons.

NOW OR NEVER WITH OUR TRADE.

The time is at hand that calls for what might be termed a widespread Latin American movement in the United States. The commercial, economic and social conditions of our southern neighbors invite our immediate and particular attention. To say that it may be "now or never" with North American prestige and trade in Central and South America is not a statement of an alarmist or pessimist. It is a simple and logical conclusion drawn from a thorough study of the actual situation.

There never was a period in the history of the relations of the United States with her sister American republics that afforded such combined opportunity and necessity as the present for the development of our commercial interests and moral influence. On the other hand, there never was a time when European nations and business interests put forth such efforts, as they are now legitimately exerting, to increase their own prestige and trade in South America. Although the situation should be one of closest rivalry where the United States can and ought to win, if it does not give Europe too long a start, the advantage now is decidedly with the latter. There is no gainsaying the fact that Latin America today is strongly inclined to be more sympathetic, in its actual likes and dislikes, with the Old World than with the United States, because of plain reasons of race, language and association, which will be further discussed later on.

LATIN AMERICA MOVING RAPIDLY FORWARD.

Our sister republics are now making a progress that challenges the attention and respect of the world. Some of them are going forward with such splendid energy that they are running a close race with the past records of the United States and the present achievements of Japan. Others are on the verge of a progressive growth that will astonish skeptical critics of the Latin race and delight knowing admirers of their latent possibilities.

In short, it is safe to predict a forward movement during the next decade for the Latin American republics that will give them a position and prominence among the nations of the earth not thought possible a few years ago. It will bring to them a commerce for which the United States and Europe will compete with every resource at their command.

That the speaker may not be deemed overenthusiastic or be too severely arraigned by pessimistic interpreters of the future, I desire most humbly to point out that all the predictions I made ten and twelve years ago, while United States Minister to Siam, about the future of Japan and the general commercial development of the Far East, and which caused me to be called many unpleasant names by those who opposed my views, have more than come true in every respect. The premises on which I based these predictions, while outlined as a result of careful study and investigation, were not any more secure than those on which I base my faith in the future of Latin America.

REVOLUTIONARY MOVEMENTS EXAGGERATED.

Too much importance is now attached in the United States to the idea that revolutions prevail all over Latin America, and that, therefore, commerce and investments are insecure. This conception of Latin America as a whole is entirely erroneous and does our progressive sister republics a great injustice. The continent of South America today is free of serious insurrectionary movements, with few, if any, indications of more civil wars. The recent conflict in Central America was unfortunate, but it served to emphasize the firm peace and prosperity of Mexico. The tendency of public opinion and the powerful influence of large business interests in such great nations as Mexico, Brazil, Argentina, Chile and Peru are all against revolutionary movements, and, although now and then some slight sporadic attempt shows itself, it is most difficult for it to grow into dangerous proportions. Then, again, the gridironing of these countries with railways permits the immediate sending of troops to any place and crushing without delay incipient revolts.

A Critical Time for the United States.

This address is phrased in direct and earnest terms, because I believe what I say. As already suggested, I hold that the United States has reached a most critical period in its relations with Latin America. What is done or accomplished during the next two years may determine forever the relative position of North American trade and prestige in Central and South America. The Pan-American Conference in Rio Janeiro and the visit of Secretary Root to South America should awaken sufficient interest throughout the United States in this part of the world to inspire our people, in general, and our newspapers, our manufacturers, our merchants, our Congressmen, our travelers, and our students of foreign intercourse, in particular, to a new and active appreciation of the Latin American republics.

Without half the reason we have for improving the opportunity, European commercial, financial and diplomatic interests, with commendable judgment and spirit, which we cannot criticise but must admire, are alive to the situation and doing everything legitimately in their power to gain a hold of which they cannot be dispossessed. They keenly realize the present and future possibilities of the material and economic exploitation of Latin America, and they are leaving no stone unturned to gain the necessary advantages before the manufacturers and tradesmen of the United States suddenly become aroused to the situation and compete for its control.

Some Convincing Pan-American Figures.

Let us endeavor to picture in our minds some additional figures that are convincing. The total area of the twenty-one American republics, including the United States, is practically twelve million square miles. Of this area the Latin American republics occupy nearly nine million. Contrast with this the fact that the United States, without Alaska, occupies only a little over three mililon square miles. But this is not all. Probably only a small percentage of the people of the United States realize that Brazil, the principal republic of South America, is considerably larger than the United States proper. Let us put it in another way. If the United States were laid on the map of Brazil, there would still be room left for the German Empire within the limits of this great South American republic. Expressed still another way, there would be room, in addition to the United States proper, for all of New England, New York, New Jersey, Pennsylvania, Delaware and Maryland.

If this fact is not sufficiently astounding, it would be well to bear in mind, furthermore, that out of the Amazon River there flows every day five times as much water as goes forth from the Mississippi. While ocean steamers can only go up the largest river of the United States a very short distance to New Orleans, vessels as large as the transatlantic liners can proceed up the Amazon for a thousand miles to the port of Manaos. Steamers of from 15 to 20 feet draught can navigate another thousand miles further to Iquitos, Peru, and ordinary river boats, like those that run on the upper waters of the Mississippi, can travel great distances in different directions on the branches and canals of the Amazon. What this means for the future development of Brazil no one can possibly picture, for that country is only in the infancy of its progress.

Pan-American Area and Population.

In considering the area of these different countries, let us also bear in mind that the Argentine Republic, situated in the southern temperate zone, and having a climate like that of the United States, occupies a section of country as large as all that part of the United States east of the Mississippi River, plus the first tier of States west of that river, or nearly 1,200,000 square miles. Peru, which is going ahead so rapidly, is as large in area as all our Pacific Coast States, plus the first tier of States back of them; and Bolivia, which is entering upon a new era of progress, would cover all the States of the Central West bordering on the Mississippi River. The smallest country in all Latin America, Salvador, is almost exactly the same size as the State of New Jersey.

But this statement of area would mean nothing if it did not have a considerable population. The total number of inhabitants in the American republics is about 150,000,000. Of these approximately 65,000,000 reside in Latin America. While they may not be rated as up to date and enterprising as the average North American, yet they are going ahead with a progress that is astonishing. Specifically considering this population, we find that Brazil now boasts of 20,000,000, Mexico 15,000,000 and Argentina 6,000,000. And yet not one of these countries holds one-twentieth of the population it could support in view of its natural resources.

I would venture the statement that very few of you are aware that Buenos Aires, the capital of the Argentine Republic, has a population of 1,100,000, and is growing faster than any other city on the western hemisphere, with the exception of New York and Chicago. It is, moreover, as beautiful and attractive as it is large. Rio Janeiro, the capital of Brazil, has a population of nearly 900,000, and is fast becoming one of the most attractive cities in the world. Last year it spent more money in public improvements than any city of the United States except New York. Montevideo, the famous capital of Uruguay, is as large as Washiugton, with a population of over 300,000. Santiago, the well built capital of Chile, boasts of over 300,000 people, while such capitals as La Paz, in Bolivia; Quito, in Ecuador; Bogota, in Colombia; Caracas, in Venezuela, and Mexico City, in Mexico, are all progressive, picturesque and interesting.

The Value of Latin American Commerce.

Now you ask what did these countries of such area and population do in trade, because that is what chiefly appeals to you. I am glad to tell you, for the record is an instructive one. The total foreign trade, exports and imports, of the twenty-one American republics, amounted in 1906 to about $5,200,000,000. Of this the share of the twenty Latin American nations was nearly $2,100,000,000, or more than one-third. Certainly a foreign commerce exceeding two billion dollars is worth the best efforts of the exporters and manufacturers of the United States. What is the proportion which the United States has of this? The latest records show that our country bought and sold in its exchange of business with Latin America, last year, products valued at approximately $600,000,000, or between one-third and one-fourth of the total Latin American foreign commerce. This is far better and hence more encouraging than most people suppose. It is a share of which we need not be ashamed, and yet it is much below what it ought to be. There is no reason why the United States should not control practically one-half of the exports and imports of our sister republics, and we will accomplish this result if we are up and doing and master the field. *During the last ten years our trade with the countries to the south of us has increased nearly one hundred per cent.* During the next ten years it ought to grow 150 per cent.

Difference of Lineage and Language.

A great factor unfavorable to North American trade and influence in Latin America is the *essential difference in lineage and language;* but this point is little appreciated. The power of similarity in race and tongue is mighty. Kinship in these respects brings men closer together. It makes them more sympathetic, and this counts much in Latin countries. The average North American, instead of carefully studying methods of counterbalancing these adverse conditions to his progress in Latin America and of adapting himself thereto, undertakes an independent line of action and ultimately fails in his purpose.

The second great factor is corollary to the first, and it is one of which, in our seeming abundance of knowledge and self-confidence, we are lamentably ignorant. Frankly termed, it should be called the *"Holier than Thou"* attitude, too commonly and persistently assumed by North American statesmen, newspapers, writers, travelers and business agents when discussing or dealing with Latin America. In other words, the people of the United States have too much and too characteristically *"patronized"* the peoples, customs, institutions, achievements and governments of their sister American nations. Per contra, we should give Latin America more credit for its actual and praiseworthy progress in developing stable national and municipal government; in promoting both high class and general education; in making its own excellent literature, historical and romantic; in advancing scientific investigation and invention, in solving grave social and economic problems, and comprehensively striving under difficult conditions to reach a higher standard of civilization.

Spanish or Portuguese Should Be Learned.

As to language, it is difficult to speak with patience. So small is the percentage of North Americans visiting Latin America, on business or pleasure, who speak Spanish or Portuguese, or French, that it is a wonder that they make any progress in their plans. Ninety-five per cent. of the Europeans who go to Central and South America understand one of these tongues. I mention French, because nearly all the well educated Latin Americans speak that language. This subject requires no argument—it is simply impossible for the North American who knows none of these languages to become thoroughly *"simpatico"* and to master the Latin point of view in either commercial or political relations. I would that both our business schools and regular colleges might make the study of either Spanish, French or Portuguese compulsory in order to receive a diploma.

Lack of Fast Steamship Facilities.

In studying the causes that act as deterrents to Pan-American accord we must emphasize the lack of first-class passenger and mail steamship service such as characterizes the systems of communication between Europe and Latin America. The long established and well defined association of Latin Americans with Europe has been immeasurably encouraged by the excellence of steamship facilities, which have given them ready access to the satisfactory conditions found there in turn, for business transactions, education of families, and enjoyment of leisure and travel. If the average merchant and traveler of South America could reach New York with the same comfort and speed that he can proceed to Paris, there would be at once a vast and radical change in the situation favorable to the United States.

This statement is not introduced as an argument for a "subsidized merchant marine." I am not discussing the pros and cons of that mooted issue. I am simply stating a fact and describing a condition. That there is *not one first-class fast* mail and passenger steamer running between New York in the United States and such important South American points as Rio Janeiro and Buenos Aires was given glaring prominence by the experience of the delegates to the Pan-American Conference, held last year in Rio Janeiro. Only a few could obtain accommodations on the one little vessel that, with its sister boat, makes monthly trips to the great capital of Brazil. All the others were forced to go via Europe, where six different lines provide a score of splendid, modern, up-to-date, fast ships between the principal ports and those of South America.

Other Important Considerations.

Having enlarged upon some of the most important general considerations bearing on our commercial and friendly relations with Latin America, it is now well to enumerate, without comment, a few specific but still interesting agencies that demand attention, improvement or development, such as:

The extension of the work and sphere of usefulness of the International Bureau of American Republics in Washington, D. C., so that it will become a world-recognized and powerful institution for the promotion of commerce and comity.

The invariable appointment of men of education and experience, combined with energy and tact, as ministers and consuls to Latin American capitals and ports.

The giving of credit to reliable purchasers, as is done by European shippers, instead of always exacting payment in advance or on shipment.

The use of greater care in packing goods for the long distance to be traveled, for the severe changes of climate, and for the size of parcels required in different markets.

The opening of North American banks, or branches thereof, in the principal cities of South America.

The early building of Pan-American railway connections so that North, Central and South America may be literally united with ties of steel.

The investment of North American capital in the resources, mines, industries and in the construction of railways, tramway and electric light plants, in the more peaceful and progressive countries of South America.

The correction, through the careful diplomacy of our ministers and consuls, and the just policies and methods of our business men, of the false impressions in regard to the intentions of the United States toward Latin America as existing in the minds of some Latin American editors and publicists, and the gradual development, in place thereof, of a kindly attitude toward their Yankee sister republic, so often described as the "Yankee Colossus" and "Yankee Peril."

EXPORT POSSIBILITIES OF THE AUTOMOBILE.*

By Ernest Coler.

The opportunities of the American motor-car manufacturer for increasing his exports are particularly good at the present time. The widespread use of automobiles in this country, the roads of which are infinitely more trying upon an automobile mechanism than the well-kept roads of European countries, have demonstrated to the foreign user the good quality of the American car. As a matter of fact, many foreign houses are eager to secure American agencies, but are slow in making connections on account of the slipshod manner in which some American manufacturers treat their customers abroad. One drawback consists in the limited knowledge of the foreigner about the merits of American automobiles. When the first small, single-cylinder runabouts were made in this country many of them were shipped abroad and found ready buyers. But the demand of the home market made it unnecessary to bestow much attention later to the foreign market, so that the picture of the first American automobile still lingers in the foreign mind as the representative of our skill in motor-car building.

An educational campaign in which the foreign motorist is made acquainted with the advantages of the product of the United States, and the sending to foreign countries of intelligent and capable men will be one of the steps in the onward march of the American automobile into foreign fields.*

A problem of less complexity is found in the markets other than European, since in most of them the American may compete with the foreign manufacturer on virgin territory. An exceedingly promising field is British North America, whose purchases of American automobiles for the eleven months ending May, 1907, amounted to $1,020,411. The market of British Columbia has been sadly neglected by the American dealer, who seems to know very few details concerning the growing importance of the Great Northwest and its neighboring territories under British domain. Three years ago only three automobiles were used in Victoria, while today there are more than one hundred—nearly all of American origin.

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* As this article goes to press, Alfred Reeves, general manager of the American Motor Car Manufacturers' Association, has gone abroad to study foreign conditions, with a view of a more aggressive invasion of the European market by the makers of American automobiles. His trip is the result of official action on the part of the Motor Car Manufacturers' Association.

Mexico purchased $762,650 worth of automobiles in 1907.

Another field almost wholly neglected is Africa. Especially do Johannesburg and Witwatersrand present an attractive territory for American automobiles, and one which has engaged the attention of English and French manufacturers, with the result that a large number of cars of all descriptions have been sold. British South Africa imported $836,685 worth of motor cars during the year ending June 30, 1906.

The French car seems to have obtained the lion's share of South American business, and it is here where the American product is likely to make the first inroads. The South American motorist likes a sporty-looking machine of a build closely resembling the conventional racing car. There is no doubt that the American manufacturers who first turn serious attention to the South are certain to reap a bountiful harvest, for the South American business man is as keen as his northern brother in availing himself of every advantage offered by new inventions, especially in transportation means, which become all the more valuable in view of the fact that many points are not yet connected by railway.

To summarize the situation, it may be said without exaggeration that the American automobile industry represents a phase in our industrial development that has no parallel in history, and which is destined to bring to American skill and enterprise most substantial recognition.

The present state of the industry, great as it is, gives only a suggestion of the future. But the time is fast approaching when all civilization will be traversed with national and international good roads—from empire-spanning trans-continental highways to less important byways penetrating to the remotest settlements—all thronged with independently operated small units of traffic, propelled by mechanical power.

FOREIGN TRADE OPPORTUNITIES.

Specific inquiries from foreign subscribers and readers of the American Exporter for American machinery and goods are referred direct to advertisers of the publication in the line to which the inquiry belongs. In some cases, however, inquiries are received for lines not represented in the advertising columns of the American Exporter, or for goods which the advertisers cannot at the time supply.

The names and addresses of the following prospective customers will be given to responsible manufacturers on application, giving the number:

558. Special Machinery.—From Cadiz, Spain, inquiry for machinery for making pins.

559. Motor Cars.—From Canary Islands, inquiry for motor car to carry twenty persons and express packages.

560. Special Machinery.—From Leghorn, Italy, inquiry for machinery for making cinematograph films.

561.—Hardware, Jewelry, Etc.—Barcelona, Spain, commission house desires to negotiate with exporters of jewelry, hardware, raw cotton, meat extract, condensed milk and typewriters.

562. Textiles.—Well recommended agent in Iquique, Chile, desires to represent makers of cotton goods, flannels, chintz, knit goods, etc.

563. Woolen Mill Machinery.—Newly organized company in Salonica, Turkey, is in the market for complete outfit of woolen mill machinery, and would be glad to enter into negotiations with an American to install and superintend the plant.

564. Fancy and Colored Glass.—A well known firm at Frankfort-on-Main, Germany, with branches in London and Austria, desires to study the offerings of American manufacturers of glass, especially in fancy and colored styles.

565. Soda.—Cuban desires to buy silicate of soda, rosin, caustic soda and other chemicals, and cottonseed oil, for making soap.

566. Steel Goods.—From Christiania, Norway, an inquiry for cold rolled steel axles and galvanized corrugated iron.

567. Textile Machinery.—House in Sevilla, Spain, contemplates establishment of small factory for making yarn goods, especially sweaters, shawls, etc.

568. Cotton Thread Machinery.—From Caracas, Venezuela, an inquiry for small factory for weaving cotton, to be run by electricity or hand.

569. Tobacco Cases.—From Santiago, Cuba, inquiry for leather or other cases for fine cut tobacco.

570. Telephones.—Inquiry from Venezuela for catalogues of telephones and telephone equipment.

571. Flour.—Agent in Wiborg, Finland, desires to represent flour manufacturer; Kansas flour preferred.

572. Match Machinery.—From Barranquilla, Colombia, inquiry for machinery for making safety matches. The concern in question is ready to send a representative to this country to study the matter.

573. Special Machinery.—From Lima, Peru, an inquiry for machinery for making enameled iron letters and signs.

574. Woodworking Machinery.—From Buenos Aires, Argentine Republic, inquiry for machinery for making parquet floors; also for catalogues of houses making wooden mosaics for flooring.

575. Waterproof Coats.—House in Montevideo, Uruguay, sends inquiry for seventy waterproof overcoats.

576. Linen Machinery.—Inquiry from Haiti for machinery for cutting collars, cuffs and men's shirts.

577. Cheap Musical Instruments.—From Verona, Italy, inquiry for cheap pianos and harmoniums.

578. Paper.—Leading Belgium house desires samples and prices on white paper for newspaper work, also glazed paper, paper for making wall papers, wrapping paper and book paper.

579. Water Meters and Sanitary Supplies.—Municipal authorities of Jassy, Roumania, desire catalogues in French or German of water meters and porcelain and cast iron sanitary supplies.

580 Printing Machinery.—Inquiry from Panama for complete printing outfit for a newspaper.

Egyptian Public Works and Supplies.—Consul-General L. M. Iddings, of Cairo, has forwarded to the Bureau of Manufactures, Department of Commerce and Labor, specifications for bids for certain public works and supplies required by the Egyptian Government: (1) Electric installation for the quays at Alexandria; (2) hospital clothing; (3) bridge over the Bahr-el-Aama Canal; (4) road bridge over Nile at Boulac and at Cairo, respectively (limit December 26). Full details and plans in both English and French may be secured from the bureau.

Brass Foundry and Soda Factory.—A limited liability company in India are desirous of adding a brass foundry and soda factory to their business, and ask to be furnished with estimates of cost of the necessary buildings and machinery. Address Director-General of Commercial Intelligence, Calcutta, India.

SEEN IN SCANDINAVIA.

Commercial Aspects of Denmark, Norway, Sweden and Finland—Growth of Interest in American Goods and Modern Improvements—Local Industries.

BY B. OLNEY HOUGH.

HELSINGFORS, October, 1907.

SCANDINAVIA includes, we are accustomed to say, Denmark, Norway, Sweden and Finland. If for purposes of this letter I group these countries together in this general way it is only because space is limited. For it is all too common a mistake to consider the four countries in the same category or to arrange business relations with them as though the four virtually made one and Scandinavia were a homogeneous entity. This is far from being the fact, today more emphatically so than ever before. Denmark is exceptionally conservative and economical and buys the cheaper grades of goods. Sweden is extravagant and wants the best of everything. Norway's prosperity hitherto has rested on her fisheries and her mines; Norway is democratic to a degree. Sweden has large agricultural interests, boasts of and cherishes an ancient nobility, is building up and fostering important manufactures. The Grand Duchy of Finland is neither Swedish, Danish nor Russian, and strenuously insists on being considered by itself alone. Money is at least 1 per cent. dearer today in Sweden than in any of the other three countries, yet taxation in Norway, I am told, amounts to almost or quite 20 per cent. of a man's income, as contrasted with 5 per cent. only in Denmark. The march of events in recent years has further pronounced the separation commercially, no less than politically, of these four parts of Scandinavia. Efforts of Norwegian business houses to make sales in Sweden, or vice versa, meet with anything but a friendly reception, and Russian and Swedish goods are not popular in Finland. Denmark is the friend of all three, yet in all the "national spirit" is rampant, and the feeling seems to be that Danish merchants should stay at home and leave the commerce of the other countries to their native houses.

In the ten years that have elapsed since I last visited Copenhagen I find that practically all of its early prejudice against American goods, because new and unknown, has evaporated into thin air. The existence and apparent prosperity of a large and handsome "American shoe store," with boots and shoes of American manufacture in the show windows of half the shops in town, recalls the days when a dozen assorted pairs, imported from New Orleans (of all places!), constituted our sole representation in this line in Denmark's capital. A Danish-American friend of mine whose total business his first year in Copenhagen, ten years ago, consisted of thirty barrels of the certain kind of American paint in which he is interested, is this year receiving from 1,000 to 2,000 barrels every month. Large stocks of American machine tools and agricultural implements seem to betoken continued success in these lines, while American automobiles on the streets and American motor boats in the harbor, even though in limited numbers as yet (for the Dane is ultra conservative), are further indications of appreciation here for American goods.

"The King is dead! Long live the King!" The change from the old to the new seems to have meant little if anything to Denmark. Ten years ago I chanced to encounter the old King making a solitary promenade along one of the pleasant by-roads in the suburbs of Copenhagen, accompanied only by two of his historic dogs. A lifting of hats, and the old gentleman, the "father-in-law of half of Europe," went on his solitary way. The democratic spirit continues, although it seemed to me that on this visit I saw a few more royal scarlet liveries about the streets than formerly. And Denmark is prosperous. Little complaint is heard of "tight money," for if prosperity has induced speculation in certain directions the older and stronger banks have bolstered up weaker brothers, and there have been no failures to speak of. Copenhagen has been growing rapidly. For instance, a sprawling nearby village of perhaps 500 people ten years ago has now developed into a thriving suburb of 25,000. Building has been extensive, though handicapped of late by a serious strike in that trade. Ten years ago the Danes exclaimed in horror at the idea of electric trolley street railways. The rest of the world might risk what they pleased, but as for Copenhagen—the horse car was good enough, and they knew it to be safe. Copenhagen's new overhead trolley system is only three or four years old, but goes to prove that modernity ultimately triumphs here as elsewhere, and holds out the hope that the present exasperating restrictions as to the use of automobiles may shortly be removed. For the bucolic mind, largely predominating in Denmark's Parliament, filled with presentiments of a terrible fate awaiting its horses and cows, has ordained that no automobile may be driven along a road less than 33 feet in width or at a speed greater than 15 miles per hour. Denmark is a paradise for the cycler, and I should estimate that there are more bicycles per capita in that country today than in any other. Smooth, level roads stretch in many directions and lead to innumerable picturesque and delightful resorts. Twenty miles only from Copenhagen lies the town that Shakespeare made known to us as Elsinore, and out and back is reckoned a mere nothing by many a Copenhagen mistress of a wheel. I am inclined to prophesy that some day the motor car will be equally as popular in Denmark.

One speaks of Norway, the grandeur of her fiords, the midnight sun, and one sometimes forgets that she is aught else than the resort of tourists during the summer, or, so quickly do we forget, that only a few months ago Norway was the prime factor in one of the most extraordinary political events known in the world's history. The separation of Norway from Sweden was peacefully effected, the books will say, thereby setting a glorious example to the civilized world. But how many of us know, or remember it if we ever knew, that for three weeks Swedish and Norwegian armies lay encamped only a few miles apart from each other on their respective sides of the frontier, prepared to join battle (the Norwegians say) the very hour that their envoys were insulted? Without attempting to delve into strange politics or to examine either causes or the course of events, I think that I may say that the fundamental reason for the break in relations that had existed from the days of Bernadotte lay in the growth of a national spirit in Norway, with which, as always with the weaker party, we are prone and glad to sympathize in the United States of America. Questions as to consular representation, as to diplomatic envoys, as to foreign ministers, all seem in my mind to resolve themselves down to this fundamental one—independence. And yet, had not King Oscar been badly advised, had he disregarded his Swedish ministers and accepted Norway's invitation to visit her, both sides unite in acknowledging that there would have been no break. Separation may and probably will, however, prove beneficial to both sides.

Under the genius of Mr. Mikaelsen, her Prime Minister, who has been her guide several years past, Norway appears to be making satisfactory progress. Deficient in agricultural resources, she has a shipping trade enormously out of proportion to her population. Her undeniably rich mines are gradually being developed, her fisheries and the export of their products are being increased, as is her rivalry with Sweden in the manufacture of paper, wood pulp and matches. However remote the visits of Vikings to our shores, there still persists in the land from which they sailed a strong sentiment of affection for America, and the desire for American friendship and sympathy, along with a readiness, if not an eagerness, to buy American goods. "A small market," the manufacturer exclaims. It is true; but a favorable disposition in a small market may result in larger business than an unfriendly feeling in a much larger market.

In fact, in considering Norway and Sweden, I am irresistibly tempted to make a comparison with two of our own States, say New Jersey and Delaware. For Norway's total population is only about two and a half millions and Sweden's less than twice as much. The support of two royal establishments, of two armies and two navies may seem a needlessly heavy incubus to lay on such limited populations. Yet the Norwegians voted with practical unanimity for a king instead of a republic, while the Swedes sneer at Norway's present attempts to be recognized by the greater powers as a neutral nation, pointing with pride to the fact that they, the Swedes, are, on the contrary, increasing their army and building new ships for their navy. What would the State of New Jersey say to a project for a separate navy? But then New Jersey has not the bogie of a Russia overshadowing her.

In Sweden the adjective "American" is one to conjure with. You see American hats and American shoes placarded in show windows—whose subjects never saw the interior of one of our factories. The genuine American articles are to be had also, of course, and you may go shopping for them in American automobiles, since the greater part of the forty-five motor cabs in the streets of Stockholm were imported from the United States. The national industries are flourishing. As in other parts of Scandinavia, paper, pulp, sulphite and sulphate are the predominant subjects of any commercial discussion, though Swedish interests in these lines far outweigh those of her neighbors. Parenthetically, I may remark that it is agreeable news to the visiting American to learn that much if not most of the paper mill machinery comes from the United States; that a contract was last week closed for an equipment of American machines, aggregating $20,000 in value, while mysterious rumors abound of a $400,000 contract soon to be placed with our manufacturers. Swedish matches have so long been a staple article of import the world over that Danish, and even Belgian, factories have thought it desirable or necessary to brand their boxes with Swedish stamps in order to obtain or facilitate sales. Swedish steel is the best in the world, is the cry, and steel manufacturers, with allied machinery, locomotives and agricultural implement factories, are making rapid progress. In agriculture Swedish interests are tending more and more to beet cultivation, especially as within recent years it has been found that enormous tracts of land in central Sweden are equally as well adapted to growing beets as the older territory in the south formerly devoted to this object. How important a business this and its attendant manufacture of sugar is may be judged from the formation within a month or two of a Swedish sugar trust with a capitalization equivalent to about thirty millions of dollars. Pretty large for a small country like ours, rather proudly comments the Swede.

Trusts are the order of the day in Sweden, match trusts, paper trusts, sugar trusts—but, adds the native, we shall control our trusts. We believe them to be a good thing; they shall never run away from us.

A striking indication of a rejuvenated Sweden is to be noted in the fact that the return of Swedish-Americans to their native land is now one-third greater than ever before. How many of them remain is impossible to determine, but they are wanted at home, the stay-at-homes confess, and I am told that the Government is taking measures to facilitate their return to Swedish domicile and citizenship, endeavoring, for example, to modify certain obnoxious laws relative to the ownership of property, etc. Projects for a direct steamship line between a Swedish port and New York are being actively agitated, and it is to be hoped it will soon reach a successful conclusion, for the present necessary transshipment of goods exchanged between the two countries is a distinctly serious handicap to enlarged relations. The project at present under discussion contemplates the investment of four million dollars in new steamers with which to establish the service in question. It is characteristically Swedish that the best boats only are wanted. If they can't have the best then they are content to let other flags do their carrying for them.

A certain Gustaf is still referred to by some Swedes as "the King who lost Finland for us." But if there is a disposition in Denmark and Sweden to claim kinship, and in Sweden a sort of proprietary interest in Finland, a reciprocal feeling among the Finns has not discovered itself to my inquiries, though limited and superficial as I must confess they have been. On the other hand, merchants in Finland with whom I have spoken on the subject seem inclined to feel that their country has done very much better under Russian tutelage than she would ever have done under Swedish. Politically the better classes in Finland profess themselves well satisfied with present arrangements and only fear that they may be spoiled by injudicious socialistic agitation and opposition. To the visiting foreigner the country seems to occupy an anomalous position. Russian soldiers and officers are seen about the streets, Russian ships of war lie in the harbors, a Russian stamp carries his letter out of Finland; but his hotel bill is paid in Finnish marks and the Finnish custom house is a thing apart from its Russian prototype, and the traveler's luggage must again be examined as he crosses the frontier between Finland and Russia. Russian domination and large Swedish settlements are responsible for the tri-lingual signs on the street corners, but Finnish is the language of the country.

A land of forests and lakes, Finland's industries have only lately attained notable proportions. Here, too, it is paper and allied industries that engage greatest interest. In 1905 there were in Finland thirty-one wood pulp works, ten cellulose factories and nineteen paper mills. During 1906 no fewer than seven new paper mills and twelve new sulphate cellulose factories were either built or determined upon—an increase that strikingly illustrates the spirit of progressiveness and enterprise that is abroad in the land. And I do not know that I have ever visited a country where American goods are more highly esteemed and more generally inquired for than in Finland. Enterprise here seems not to be timid, new articles and new devices are sought out and unhesitatingly given a trial. Not only does American machinery equip the mills, but American saws, files, boots and shoes, automobiles and bicycles, motor boats and heating apparatus are all of them familiar and favorites. An addition to the Helsingfors Hospital is now under construction, built of concrete stone blocks made by American machines. Advertisements even from smaller and interior towns call attention to American desks carried in stock, and almost every merchant whom I have called upon has expressed a desire to get in touch with new lines of American goods. In which respect, it goes without saying, Finland but sets a glowing example to the rest of the world.

PATENT MEDICINES.

South Africa is a fine market for patent medicines. Physicians are not numerous and the scattered population depends upon patented medicines to a large extent. A question of importance to manufacturers of patent medicines has just arisen in the Cape Colony in connection with the working of the General Dealer's Act. The act declares that a general dealer's license covers the sale of "patent and homœopathic medicines and of the medicines commonly known as Dutch medicines." This seems to include all concoctions known throughout the world as patent medicines, but the officials of the Cape Government interpret the word "patent" to mean only medicines patented in the Cape Colony.

AVOIDABLE OBSTACLES TO AMERICAN FOREIGN TRADE DEVELOPMENT.

Some Weak Points Which Only Need a Little Attention on the Part of Manufacturers to Overcome Deficiencies.

BY JOHN BALL OSBORNE

(Chief, Bureau of Trade Relations, Department of State.)

ADVICE in regard to trade obstacles that is worth giving is worth repeating. Indeed, like an advertisement, it depends for effectiveness upon frequent repetition. It is said that the entire history of the world is retold every seven years for the benefit of oncoming generations of readers.

In recent years many valuable and instructive consular reports embodying practical information of the kind above mentioned have been published and read to advantage by American exporters. The same feature has distinguished the work of the few special agents sent out by the Department of Commerce and Labor to investigate trade conditions in foreign countries. As a rule their reports have discussed in detail and with ability the existing hindrances to the extension of American trade and the proper means for their correction.

The selection of proper market is an essential feature of success in an export campaign, as many a manufacturer who has made costly mistakes can testify. In nearly every instance these errors might have been avoided if he had carefully studied the field before attempting to enter. There are limitations imposed by the climate, by ineradicable racial prejudices, by religion, by restrictive tariffs, etc., that must all be considered by the American manufacturer whose output has exceeded the demands of the home market and who sits down with the map of the world before him, potential resources behind him, and his ambitions fired for universal conquest. The question of foreign tariffs may or may not be a vital one. Fortunately, there are now very few countries that discriminate against imports from the United States. France is practically the only country of Europe that maintains discriminating duties against our products, although Germany does not actually admit all of them at the lowest rates of her new tariff. Haiti favors France. Canada favors the mother country, as do Australia, New Zealand and the South African Customs Union. In all such instances the American manufacturer must decide whether the tariff discrimination is prohibitory.

Some of the limitations upon our export development to which I refer are, of course, not susceptible of correction; but the instances of misdirected energy arising from ignorance are all avoidable by more careful examination of actual conditions. The moral is, in case of doubt consult the American consul who is on the spot.

Under this head comes a great question of policy to be determined according to the circumstances. Every intelligent exporter knows that the most effective way to introduce his goods in a foreign market is to send out trustworthy and capable commercial travelers with a full line of samples, and, at the same time, to maintain agencies in one or more convenient cities in each country, carrying the goods in stock.

But this method is the most expensive known to commerce and its cost precludes its universal adoption. Many manufacturers are obliged to reject it altogether on account of the character of their products, lack of resources, or limitations of the foreign demand, while others follow the plan in some trade regions and wisely avoid it in other fields. The proper decision in each particular case is a matter of economics and common sense. But even though the business does not justify the employment of commercial travelers, the foreign sales of American goods can, in the great majority of cases, be profitably promoted through the medium of established agencies carrying the goods in stock or at least a full line of samples. But in the matter of direct representation, mistakes of omission are far more numerous than those of commission. It is undoubtedly true, as claimed by our consuls, that hundreds of American manufacturers are seeking to gain a foothold on difficult ground merely with the aid of correspondence, illustrated catalogues, price lists, etc., when the character of the market, the nature of their goods, and their available means dictate the wisdom of employing competent agents to systematically canvass the field in the manner of their trade rivals.

On the other hand, there are thousands of articles of American manufacture, among which may be mentioned special machinery and small novelties, that may be sold through advertising followed up by the distribution of catalogues through this medium. As one of the special agents of the Department of Commerce recently reported, the finest catalogues in the world are issued by American firms.

Advertisements placed in the proper mediums, and serving the double purpose of creating a demand among retailers and consumers and securing foreign agencies, have in a great many cases resulted in building up enormously profitable business without personal visits and at the risk merely of the advertisement. As a matter of fact, Americans understand the art of advertising better than any other nation in the world, and when they do employ this medium it is done with skill.

Among all the complaints against American business methods that are made the subject of official report by consular officers there is none that appears more frequently and is more emphatically expressed than that relative to the packing of merchandise exported abroad. Advice on this subject has been published in the consular reports with regularity for twenty or thirty years past, and yet it is only recently that tangible results for the better have been made.

The most numerous complaints on this score of late have come from consuls in South America and the Orient. These complaints relate to both the security and the weight of the package. Goods have arrived in damaged condition owing to unskillful internal packing and frail cases. Not infrequently such poor judgment as to the character of the packing is exercised that the freight charges are unduly increased. In most countries the import duties are specific and collected on the gross weight; it is therefore desirable that the covering should weigh as little as is consistent with safe carriage, particularly when the rates of duty are high.

The unfavorable influence of bad packing, whenever it occurs, cannot well be exaggerated. There are instances on record in the Department of State where it has absolutely destroyed a promising trade, which has been permanently diverted to foreign competitors. Writing on this subject recently an American consul suggested that our manufacturers would do well either to send intelligent men to Germany or elsewhere in Europe, where the art of packing goods for export is well understood, for a brief course of instruction, or to import specialists from those countries. There would seem to be a practical opening in this country for the establishment of a training school for this purpose. At least it might well be made a feature of the curriculum in industrial schools.

This serious question is now engaging the attention of the transportation companies. I quote the following extracts from a circular recently issued to shippers by the United Fruit Company:

"Complaints have come to us recently so persistently from merchants in Central and South America and our steamship connections concerning the inadequate packing of goods shipped from this port (New Orleans) by our steamers that we feel compelled to bring the matter to the attention of our patrons.

"European manufacturers have learned by experience that adequate packing is an excellent investment, as contents reach destination in good shape, whereas American manufacturers are neglectful in packing for export, to the detriment of merchants, transportation companies, and the manufacturers themselves.

"We ask the co-operation of all shippers and consignees in an effort to diminish frail packing, as it is to their benefit as well as to that of the transportation lines to have shipments delivered in good condition.

"We earnestly request the co-operation of commercial bodies in this important matter to protect and foster a trade which rightfully belongs to the American manufacturers."

The manner of filling foreign orders for goods by some American firms has been criticised by our consular officers; but this, of course, cannot be regarded as a general fault. Fortunately, it occurs only in isolated instances, although the publicity sometimes given to these cases creates a different impression. Some of the most reprehensible instances that I recall have been where a foreign firm has been induced by the American consul to give a trial order for goods to a reputable manufacturer in the United States, and this order has been filled with gross carelessness, to the disappointment and disgust of the importer. Sometimes the goods have been improperly packed, arriving in bad shape or with essential parts missing; sometimes the freight charges have been unnecessarily augmented by unwise packing; oftener the filling of the trial order has been unreasonably delayed. Not infrequently the chance of further orders has been lost by excessive cautiousness in securing payment on delivery, regardless of the financial standing of the purchaser. In any case the result has been discouraging to the extension of American trade. Some widely known firms have been known to pay no attention whatsoever to small trial orders.

Credit terms constitute another serious handicap to the normal development of our export trade, particularly in the several countries of Latin America and in the Far East. It is the settled practice of our European trade rivals to grant liberal terms of credit to buyers in those countries—usually six months and often nine months, or even a year. American exporters, on the other hand, usually decline to extend such long credits and are often reluctant to make any concessions whatsoever to trustworthy firms, notwithstanding a high rate of interest offered. There is no doubt that this disinclination to conform to the prevailing practice as to credit goes far to explain the relatively poor showing made by the United States in the import trade of South America. Wherever our manufacturers can be reliably served as regards credit information I perceive no valid reason why they should not attempt to meet the local requirements of trade, which are dictated mainly by the lack of plenty of capital.

But it is not merely the trade regions mentioned that send back complaints on this score. Europe, too, complains that American manufacturers often insist upon money in New York or some other city in the United States before shipping the goods; in other words, demand "money against documents." The same foreign buyers who would be willing to pay on delivery will demur to this exaction of prepayment, even although but a few days elapse before arrival of the goods. Application of this rule is apt to offend the sensibilities of ancient and honorable firms, and there is no doubt that its operation is detrimental to American trade.

It should be mentioned, however, that American manufacturers who are disposed to extend the long credits that are sought by the buyers in South America and some other countries are handicapped by inadequate banking facilities, whereas their European rivals largely enjoy those advantages. This is another obstacle that is slowly but surely being corrected.

FIRST STEPS IN EXPORTING.

Foreign Trade Not as Hard as It Seems—Importance of Details of Terms, Shipment and Packing.

BY STEVEN DE CSESZNAK.

THE development of a successful export trade requires only common sense and good salesmanship. There is nothing mysterious or complicated about it. The question of distance is almost eliminated nowadays: ocean greyhounds, overland expresses and the cable reduce space and time. There is very little difference between a manufacturer's trade in a distant State of the Union—say, Nevada, and his trade in any foreign country—say, for the purpose of comparison, Holland. Precisely the same preliminary tactics would apply in both cases. It is only in the smaller details of following up the sales attack that special differences are to be noted. A manufacturer who wants to start a successful trade in Nevada would probably first try to interest responsible dealers in the principal towns of that State. He should do exactly the same in Holland. To interest such dealers it is necessary to advertise, circularize, correspond with them and, when practicable, call upon them. We take for granted that these are the methods employed in the case of your trade campaign in Nevada, and that as a result you receive inquiries and orders from various firms and individuals. Upon receiving such inquiries and orders you will probably first of all want to ascertain the ratings and standing of the parties in question, try to find out if the inquiry comes from a jobber, retailer or consumer. Apply the same methods when you receive an inquiry from Holland, or Patagonia for that matter. Secure exact data on the foreign house and then quote them the right price, the right discount and give them the right terms. Treat the foreign merchant exactly as if he were from a neighboring State, only a little better, as far-away customers are entitled to more prompt attention on account of the longer time consumed in the transit of the shipment.

It is possible that you quote your prices to your Nevada customers f. o. b. your factory. Such quotation is permissible in the case of United States customers, as they are in a position to know the railroad freight rates, but it would not do when quoting a foreign customer. He has no means of being posted regarding railroad rates from your factory to New York and cartage from the railroad depot in New York to the steamer. It is, therefore, advisable for you at least to make your export quotations f. o. b. steamer New York City and include in your prices the cost of railroad freight to New York and cartage in New York. If the quotation is f. o. b. factory you are presenting a puzzle to the foreign dealer which he has neither time, inclination nor means of solving, and it is the writer's experience that in many instances valuable connections have been lost on this account. English and German manufacturers make it a point always to quote f. o. b. steamer London or Liverpool, Hamburg, or Bremen, as the case may be. In many instances they make their quotations c. i. f. This abbreviation means that cost, insurance and freight to the foreign port of entry are included in the quotation. It would be exceedingly gratifying to all who have American export interests at heart if American manufacturers would try to quote their prices c. i. f. Any responsible foreign forwarding agent in New York City can assist our manufacturers in this direction and give them full information regarding the steamship freight rates and marine insurance rates and thus enable them to quote to a customer in Holland c. i. f. Rotterdam, or to a customer in Russia c. i. f. St. Petersburg or Odessa.

A long step ahead would be made if our manufacturers would be more willing to quote c. i. f. Especially valuable would be such a move at the present time when our eager rivals from England and Germany are taking every advantage of the careless export methods which some American manufacturers, through stress of home prosperity, have been guilty of, and for which the innocent as well as the guilty must suffer to a certain extent. By a very slight effort c. i. f. quotations could be determined so as to cause no cut in profits, and the moral effect of such quotation on a prospective foreign customer would be great, as it would at once indicate a serious desire of the American to get the business. In your own experience in buying equipment or supplies you doubtless can recall several instances where the vagueness of a firm's reply to your request for rates and terms or its lack of courtesy and of that friendly "get-together" spirit which is the keynote of successful selling resulted in your placing your order elsewhere. How much more necessary is it that your prospective foreign customer—whose friendship once won may mean a profitable connection for years to come—should receive a courteous and definite reply, to offset the competition of English or German salesmen who are only too likely to be on the spot.

The question of export terms is one which it is usually most difficult for an American manufacturer to decide. We would again advise applying the same principle to export trade as is done right here at home: that is, if you have an up-to-date report from a reliable house which states that the firm in question is responsible and possesses ample means, there is no reason why cash in New York should be demanded. On the contrary, to meet English and German competition it would be advisable to make your terms at least sight draft against bill of lading at the foreign port of entry. Such terms would mean practically a c. o. d. shipment. The foreign dealer would not be obliged to send the money in advance, but on the other hand he could not obtain the goods unless he met the sight draft and obtained duplicate steamship bill of lading. In some instances, it is the writer's opinion, when dealing with a first-class foreign concern, it is practicable and advantageous to give thirty or sixty days' credit on acceptance. Sight or time drafts can easily be discounted in New York and the money obtained before the goods leave this port. Such proceedings certainly enable our manufacturers to meet foreign competition, which is giving credit right along to responsible buyers. Of course, when the foreign buyer or dealer is not considered reliable—when the report on him is not quite satisfactory—cash, or part cash, in New York is advisable. The writer has known of many instances where a manufacturer has "taken a chance" in extending foreign credit with ultimately profitable results and where a demand for cash would have lost the business. It is very hard to give any set rules on the subject of terms and credit. Each individual case must be considered on its own merits and a great many things taken into consideration. Among others, the political and economical situation of the country from which the order emanates. In some foreign countries the standard of commercial morality is very high, in others rather low. The business stability in foreign countries varies. Most of them are prosperous and have stable governments. Some of them, however, are politically and in a business way not so sound, and greater caution is advisable in such cases.

The problem of representation presents another dilemma to our manufacturers. We believe that when a satisfactory connection is made with a responsible dealer abroad and a full report is obtained regarding his standing and ability to cover a certain territory, it would be to mutual advantage to give such a concern an exclusive agency for a limited territory. However, this matter also ought to be decided on its own merits in each individual case. It is almost impossible to give any strict rules on the subject. In some instances a large wholesaler or jobber will prove a good agent. In other instances it will be profitable to secure as representative a concern making a specialty of acting as manufacturers' agent and is more or less, so to say, your own salesman.

Before concluding arrangements for exclusive representation it is highly important that manufacturers should consult carefully with some one who is thoroughly familiar with the geographical, social and political conditions of the country in question as well as the firm seeking the agency. There are occasions, for instance, where a manufacturer has granted exclusive German agency to a Hamburg firm, whereas it would have been far more profitable to split the German agency among two or more cities. A St. Petersburg firm is not always competent to handle all of Russia, for example. A German firm located in Warsaw can sometimes get more Polish business than a Russian firm because of political differences.

The subject of packing for export is of greatest importance and utmost care should be taken to have the packing strong and suitable for ocean transportation. It is our competitors, the English and German, who are experts in this line. Unfortunately, a great many complaints are heard from abroad about American packing. The goods must be exactly like the samples and the order carefully and correctly executed. Foreign buyers are entitled to the same treatment in this direction as your best domestic customers.

NOTES FROM HAVANA.

By Clinton P. Lampman,
(Making the American Exporter Cuban Trade Tour.)

Havana, Cuba, November 8, 1907.

Within twenty-four hours of my arrival I have run across a case of American negligence which has resulted in a firm losing a highly profitable business. An officer of one of the largest jobbing houses in Havana, doing last year a million dollars' worth of business and capitalized at $275,000, today showed me a copy of an order which he sent in 1904 to a Western manufacturer for 23 dozen alcohol stoves. The Western manufacturer held the order for cash in advance, apparently making no effort to ascertain the financial responsibility of the Cuban house.

The Cuban house promptly cancelled the order, and sent it to Germany, from which country it is now purchasing these goods in 50 dozen lots. The Cuban house tells me that they preferred the American stoves, and would be buying them to this day had they been granted the thirty days' time to which they are accustomed and to which they feel entitled by their position and responsibility. I might add that the importers in question are handling the goods of such firms as National Cash Register Co., Yawman & Erbe, Gunn Furniture Co., Grand Rapids Show Case Co., Gillette Safety Razor Co., Morgan & Wright, Burke & James, etc.

It is too early as yet for me to report at length on commercial or other matters, but in the few hours I have been here I note that the general impression is that the United States army will remain here indefinitely, and that trade as well as political relations between the island and the United States will greatly increase. Times seem good, despite labor troubles and political complications, and the custom house records show an increase of $300,000 for the month of October over those of the corresponding month of last year.

INTERNATIONAL FREIGHT.

According to an official announcement recently made, Messrs. Alfred H. Post & Co., the foreign freight contractors and custom house brokers, have been appointed managers of the International Freight Bureau, and are operating it under contract with the National Association of Manufacturers of the United States of America.

NEW CONTRACTS.

Advance Information on Important Projects Which Will Require American Machinery, Equipment and Supplies.

CHIHUAHUA TRAMWAY.

The Compañia Tranvia de Chihuahua (the Chihuahua Tramway Company), which operates in the Mexican city of Chihuahua, is about to be extended for nearly ten miles into the suburbs. The necessary material and electrical equipment will be purchased in the States. The company is controlled by Enrique C. Creel, Governor of the State of Chihuahua, and at present Mexican Ambassador at Washington. A. C. Nash is the general manager and purchasing agent.

SAWMILLS FOR CUBA.

J. H. Pierce, the Texas lumberman, has purchased several thousand acres of timber lands located at El Portillo, southern part of the Province of Santiago de Cuba, and will begin the development of the property practically immediately, which will mean the purchase of sawmill machinery, etc.

CUBAN SUGAR PROJECT.

Hugh Kelly, of Hugh Kelly & Co., whose New York offices are in the Orient Building, Wall and Pearl streets, has gone on a short trip to Europe with a view, it is reported in the sugar trade, to making arrangements with capitalists on the other side, the successful issue of which will mean the purchase of considerable American material and equipment for shipment to Cuba for sugar making purposes.

EQUIPMENT FOR MEXICAN OIL FIELDS.

The Mexican Petroleum Company, whose headquarters are in Los Angeles, is about to buy a big lot of equipment, etc., to be utilized in the development on a very extensive scale of its properties in the States of Vera Cruz, San Luis Potosi and Tamaulipas. The oil is to be used on Mexican railroads to the exclusion of coal, as the latter fuel is getting prohibitive in cost. Coal is very little mined in Mexico, comparatively speaking, and the imported product sells as high as $25 (Mexican) a ton, laid down in the southern republic. Edward L. Doheny, of Los Angeles, is president of the company.

Some interesting contracts are also expected to be placed shortly by the Oil Fields of Mexico Company. This concern is largely controlled by New York people. It owns about 10 square miles of property in the State of Vera Cruz, and holds long leases on 200 square miles more. The Mexican National is about to build a railroad which will connect the oil fields with Mexico City. The New York offices of the company are in the Exchange Place Building. Percy N. Furber is president of the company.

EQUIPMENT FOR CUBAN ORE PROPERTIES.

The Spanish-American Iron Company, controlled by the same interests which are affiliated with the Pennsylvania Steel Company, Maryland Steel Company and the Pennsylvania Railroad, is now preparing to purchase various material and equipment for the working of the recently discovered huge body of iron ore in Cuba. It is estimated that no less than $5,000,000 will be expended in the development of the property. The ore will be shipped to the States. The New York offices of the company are in the Empire Building, 71 Broadway. Chas. F. Rand is president.

CONTRACT FOR MEXICAN SUGAR PLANT.

The Mariposa Plantation Company, which is backed by Southern, principally Texan, capital, will shortly install a substantial quantity of sugar-making machinery on its property located in the State of Veru Cruz, Mexico. The president of the company is S. A. Sellers, of Austin, Tex.

SUGAR MACHINERY FOR CUBA.

The Cape Cruz Sugar Company, which is controlled by the New York sugar firm of Welch & Co., 138 Front street, is to extend its factory at Ensenada de Mora, Province of Santiago de Cuba, and it is expected will very shortly make some important purchases here.

MEXICAN POWER TRANSMISSION PROJECT.

Plans are being consummated for the construction and equipment of a huge power plant on the Quiotepec River in the vicinity of Tomellin, Mexico, where it is intended to generate electric energy for the operating of part of the Mexican Southern Railway; also for running electric traction and lighting systems in the city of Oaxaca and for supplying current for different purposes in some half dozen other towns, including Pueblo, capital of the State of Pueblo, within a radius of 100 miles of the power house. Fully 200 miles of transmission lines will be built. The longest line will run to Pueblo. The necessary concessions have already been granted by the Mexican authorities to Edward J. Cummings, who is one of the leading mining capitalists in Guanajuato.

This scheme has no connection with the recently formed combination of the American-Canadian group of capitalists which has control of the Mexican Light and Power Company and the British syndicate headed by S. Pearson & Son, Limited, of London. These interests also own various traction, lighting and general power franchises in the Pueblo district.

The Cummings project permits of the erection of a hydro-electric plant capable of developing about 50,000 horse power.

TATA IRON COMPANY.

The Tata Iron Company, which is about to construct extensive iron and steel plants in India, has awarded the contract for the designing and engineering work to the engineering firm of Julian Kennedy, Sahlin & Co., Limited, of London, England. This firm was recently incorporated on the other side for the purpose of executing contracts for the remodeling on up-to-date American lines of British steel plants, and it has already on hand several big contracts for blast furnaces. Julian Kennedy is the well-known Pittsburgh metallurgical expert.

Axel Sahlin, of the company, is now here from London in order to make arrangement for the awarding of the contracts. Mr. Sahlin was formerly one of the superintendents of the Maryland Steel Company's plants at Sparrows Point, and afterward represented the British interests of the Brown Hoisting Machinery Company, of Cleveland.

Mr. Sahlin is at the moment in Pittsburgh consulting with

Mr. Kennedy, but he is expected to arrive in New York shortly. While in this city he will make his headquarters at the offices of Chas. P. Perin, in the United States Express Building, Rector street. Mr. Perin is the New York consulting engineer for the Indian enterprise, which promises to call for the shipment of one of the biggest lots of American equipment ever sent out of this country. The work will extend over a period of fully three years.

EGYPTIAN GOVERNMENT WANTS AMERICAN DREDGES.

The Egyptian Government is about to contract for considerable dredging equipment, which is intended to be utilized for dredging certain portions of the River Nile, above Cairo. An engineering expert, A. W. Robinson, is now on this side regarding the matter. It is not quite decided yet what type of equipment will be purchased, but the apparatus will be either of dipper, suction or hydraulic type.

The contract, which will embrace all the equipment which goes to make up a complete up-to-date dredging plant, will entail an expenditure of fully $500,000. Mr. Robinson is now in Montreal. His address is 14 Phillips square. He is expected to be in New York this month.

AMERICAN SUGAR MACHINERY FOR THE FAR EAST.

The Honolulu Iron Works Company, whose New York offices, under the management of D. A. Fox, are in the Bowling Green Building, will ship large quantities of sugar-making machinery, etc., from the Eastern States in order to fill large contracts in hand for the construction of factories in Formosa.

MORE AMERICAN MATERIAL FOR SOUTH MANCHURIAN RAILROAD.

It is confidently anticipated in well informed trade circles having connections with the Far East that some very important contracts will be placed shortly for more rails, bridges, locomotives, cars and other material and equipment for the South Manchuria Railway—the extensive network of lines which the Japanese are to operate in Korea, Manchuria, Mongolia and China.

The contracts will in all probability be placed through either or all of the following Japanese export houses, having branches in New York: Mitsui & Co., 445 Broome street, Takata & Co., 60 Wall street; Frazar & Sale, 63 Wall street, and Okura & Co., Bowling Green Building. The contracts about to be placed will, it is believed, be principally for prompt delivery. Before the contracts are all completed fully $10,000,000 will have been spent here.

All the contracts so far placed here for rails and bridges went to the United States Steel Products Export Company, of New York. The cars and car trucks are to be supplied by the American Car and Foundry Company and the Pullman Company. The American Locomotive Company has been allotted the leading locomotive contract. All the principal orders have been placed on this side, the single exception being one for 30,000 tons of rails, which went to the German rail syndicate.

CUBAN SUGAR PROJECT.

Financial arrangements are understood to have been completed for the building of another sugar factory in Cuba, and the operation of a railway and extensive new sugar lands in the island, representing an outlay of about $5,000,000.

The project is that of the Jucaro & Moron Sugar and Land Company. J. J. Warren, the Cuban representative of the Mutual Life Assurance Company, of New York, is the president of the company. The secretary of the company is Geo. H. Schreiber, of the New York law firm of Davis, Symmes & Schreiber, 52 Broadway.

The initial capacity of the sugar mill will be from 120,000 to 150,000 bags of sugar during the grinding season. The first cost for the construction and equipment of the factory will be about $800,000, but eventually several hundred thousand dollars more will be expended.

The Jucaro & San Fernando Railroad and Transportations Company has leased its road—the Jucaro & San Fernando—to the Jucaro & Moron Sugar Company. This lease is until 1929. The line runs from the town of Jucaro, on the south coast of Cuba, to San Fernando, on the north coast.

Mr. Warren is expected to arrive from Cuba shortly with a view to placing contracts for different equipment, machinery, etc. He can be found at the offices of Davis, Symmes & Schreiber.

TO BUY COTTON SEED OIL PLANT FOR RUSSIA.

Vladimir Hoffmeister, chief engineer of the Murgat Cotton Seed Oil Mills, located in the Imperial Domains, Trans-Caspian Territory, is now in this country for the purpose of investigating the cotton seed oil industry and purchasing a complete plant and other equipment representing an initial expenditure of fully $50,000. At this moment he is in the South looking over the situation there, but will be in New York shortly. While here, Mr. Hoffmeister's address will be care of Vladimir A. Polevoy, head of the Russian Department of the Equitable Life Assurance Company, 120 Broadway.

NICARAGUA DEVELOPMENTS.

James Deitrick, one of the chief factors in the Agricultural and Mining Company of Nicaragua, has arrived from Europe.

He is expected to place a number of interesting contracts shortly for different material and equipment.

While here he will make his headquarters at the offices of the Nicaraguan Consul General, in the Coffee Exchange Building, 66 Beaver street, New York.

ELEVATORS FOR SOUTH AFRICA.

There is in South Africa an increasing market for elevators of hydraulic and electrical types. Reliable makes can be introduced with little trouble. Large department stores, hotels and the new skyscrapers, contemplated and in the course of erection, offer an inviting field for manufacturers of elevators, reports the Foreign Department of the National Association of Manufacturers.

NEWFOUNDLAND CONTRACTS PENDING.

Some interesting contracts are about to be placed here for material and equipment to be used in the construction of huge pulp and paper mills in Newfoundland. The first order to be closed within the next few days is for some $20,000 of contractors' tools, etc., for the Albert E. Reid & Co., Newfoundland, Ltd. This concern plans to erect large pulp and paper mills at Bishop's Falls, near the centre of Newfoundland. George F. Hardy, whose offices are in the Mutual Reserve Building, 309 Broadway, is the consulting engineer for the Reid concern. Mr. Hardy also acts in a similar capacity for the Anglo-Newfoundland Development Company. This concern is backed by the London publishing firm of Harmsworths. The project embraces the building of what is said will be the largest pulp and paper mill in the world. Electricity generated from water power will be utilized to operate the mills. No less than 20,000 horse power of machinery, it is estimated, will be installed.

SAILING DATES

NEW YORK SAILINGS.

TO LIVERPOOL

LUSITANIA, Cunard Line	Nov. 16
GEORGIC, White Star Line	“ 19
ARABIC, White Star Line	“ 21
VICTORIAN, White Star Line	“ 26
BALTIC, White Star Line	“ 28
CAMPANIA, Cunard Line	“ 30
BOVIC, White Star Line	Dec. 3
CEDRIC, White Star Line	“ 5
CARMANIA, Cunard Line	“ 7
CEVIC, White Star Line	“ 10
CELTIC, White Star Line	“ 12
LUSITANIA, Cunard Line	“ 14

TO LONDON

MINNETONKA, Atlantic Trans. Line	Nov. 16
MESABA, Atlantic Trans. Line	“ 23
MINNEAPOLIS, Atlantic Trans. Line	“ 30
MINNEHAHA, Atlantic Trans. Line	Dec. 7

TO SOUTHAMPTON

PHILADELPHIA, American Line	Nov. 16
OCEANIC, White Star Line	“ 20
ST. PAUL, American Line	“ 23
MAJESTIC, White Star Line	“ 27
NEW YORK, American Line	“ 30
ADRIATIC, White Star Line	Dec. 4
ST. LOUIS, American Line	“ 7
TEUTONIC, White Star Line	“ 11
PHILADELPHIA, American Line	“ 14

TO GLASGOW

COLUMBIA, Anchor Line	Nov. 16
CALIFORNIA, Anchor Line	“ 23
CALEDONIA, Anchor Line	“ 30
FURNESSIA, Anchor Line	Dec. 7
COLUMBIA, Anchor Line	“ 14

TO BRISTOL

JERSEY CITY, Bristol City Line	Nov. 18
LLANDAFF CITY, Bristol City Line	“ 24
EXETER CITY, Bristol City Line	“ 30

TO MANCHESTER

NEWTON. Lamp. & Holt	Nov. 23
CALDERON, Lamp. & Holt	“ 30

TO BALTIC PORTS

UNITED STATES, Scan.-Am. Line	Nov. 21
C. F. TIETGEN, Scan.-Am. Line	“ 30
OSCAR II, Scan.-Am. Line	Dec. 7
HELLIG OLAV, Scan.-Am. Line	“ 19

TO HAMBURG

PRESIDENT GRANT, Ham.-Am. Line	Nov. 16
OTTERBURN, N. Y. & Contin'l Line	“ 16
PRETORIA, Ham.-Am. Line	“ 23
KAISERIN AUG. VICTORIA, Ham.-Am. Line	“ 28
PATRICIA, Ham.-Am. Line	“ 30
BLUECHER, Ham.-Am. Line	Dec. 7
AMERIKA, Ham.-Am. Line	“ 12
GRAF WALDERSEE, Ham.-Am. Line	“ 14
A STEAMER, New Hamburg Line	“ 15
SPRINGBURN, N. Y. & Contin'l Line	“ 15

TO NEWCASTLE AND LEITH

A STEAMER, Wilson Line	about Nov. 16

TO HULL

IDAHO, Wilson Line	Nov. 27
CONSUELO, Wilson Line	Dec. 7

TO BREMEN

KAISER WM. DER GROSSE, North German Lloyd	Nov. 19
MAIN, North German Lloyd	“ 21
KAISER WILHELM II., North German Lloyd	Nov. 26
BARBAROSSA, North German Lloyd	“ 28
KRONPRINZ WILHELM, North German Lloyd	Dec. 3
GROSSER KURFUERST, North German Lloyd	“ 5
KRONPRINZESSIN CECILIE, North German Lloyd	“ 10
RHEIN, North German Lloyd	“ 12
GNEISENAU, North German Lloyd	“ 19

TO ANTWERP

ZEELAND, Red Star Line	Nov. 20
ST. ANDREW, Phoenix Line	“ 23
CAMBROMAN, Red Star Line	“ 27
FINLAND, Red Star Line	Dec. 4
MOHAWK, Phoenix Line	“ 7
VADERLAND, Red Star Line	“ 11
SAMLAND, Red Star Line	“ 18

TO ROTTERDAM

OTTERBURN, N. Y. & Contin'l Line	Nov. 16
POTSDAM, Holland-Am. Line	“ 20
PETERSBURG, Russian Volunteer Fleet	“ 20
NEW AMSTERDAM, Holland-Am. Line	“ 27
ARCONIA, Russian East Asiatic Line	“ 27
STATENDAM, Holland-Am. Line	Dec. 4
SMOLENSK, Russian Volunteer Fleet	“ 4
KOREA, Russian East Asiatic Line	“ 12
SPRINGBURN, N. Y. & Contin'l Line	“ 15

TO DUNKIRK

A STEAMER, Barber Line	about Nov. 20
CALIFORNIE, French Line	“ 23

TO HAVRE

A STEAMER, Barber Line	Nov. 20
LA LORRAINE, French Line	“ 21
CALIFORNIE, French Line	“ 23
LA SAVOIE, French Line	“ 28
LA PROVENCE, French Line	Dec. 5
LA GASCOGNE, French Line	“ 7
HUDSON, French Line	“ 7
LA TOURAINE, French Line	“ 12

TO MARSEILLES

MADONNA, Fabre Line	Nov. 20
CALABRIA, Anchor Line	“ 23
VENEZIA, Fabre Line	“ 27
MASSILIA, Fabre Line	“ 30
QUEENSLAND, Fabre Line	Dec. 3
GERMANIA, Fabre Line	“ 7

TO MALTA, VENICE AND TRIESTE

FRANCESCA, Austro-Am. S. S. Co	Nov. 21
CARONIA, Cunard Line	“ 23
CARPATHIA, Cunard Line	“ 28
GIULIA, Austro-Am. S. S. Co	Dec. 7

TO ITALIAN AND MEDITERRANEAN PORTS

KOENIGIN LUISE, North German Lloyd	Nov. 16
MORAITIS, Hellenic S. S	“ 19
MADONNA, Fabre Line	“ 20
FRANCESCA, Austro-Am. S. S. Co	“ 21
BATAVIA, Hamburg-Am. Line	“ 21
FLORIDA, Lloyd Italiano	“ 21
CARONIA, Cunard Line	“ 23
CALABRIA, Anchor Line	“ 23
PRINCIPE DE PIEDMONTE, Lloyd Sabaudo	“ 26
SANNIO, Nav. Gen. Italiana	“ 27
VENEZIA, Fabre Line	“ 27
SICILIAN PRINCE, Prince Line	“ 28
CARPATHIA, Cunard Line	“ 28
MOLTKE, Hamburg-Am. Line	“ 28
NORD AMERICA, La Veloce Line	“ 30
MASSILIA, Fabre Line	“ 30
REPUBLIC, White Star Line	“ 30
KOENIG ALBERT, North German Lloyd	“ 30
LUISIANA, Lloyd Italiano	Dec. 3
QUEENSLAND, Fabre Line	“ 3
NECKAR, North German Lloyd	“ 4
CAMPANIA, Nav. Gen. Italiana	“ 4
PRESIDENT LINCOLN, Ham.-Am. Line	“ 5
GIULIA, Austro-Am. S. S. Co	“ 7
GERMANIA, Fabre Line	“ 7
EUROPA, La Veloce Line	“ 7
FRIEDR. DER GROSSE, North German Lloyd	“ 7
ITALIA, Anchor Line	“ 7
RE D'ITALIA, Lloyd Sabaudo	“ 9
LAURA, Austro-Am. S. S. Co	“ 10
CRETIC, White Star Line	“ 11

TO CADIZ AND BARCELONA, ETC.

ERIKA, Gans. S. S. Co	Nov. 30

CUBA AND MEXICO

SARATOGA, Ward Line	Nov. 16
OLINDA, Munson Line	“ 20
MEXICO, Ward Line	“ 21
HAVANA, Ward Line	“ 23
PALOMA, Munson Line	“ 27
MONTEREY, Ward Line	“ 27
SEGURANCA, Ward Line	“ 29
SARATOGA, Ward Line	“ 30
CURITYBA, Munson Line	Dec. 4
CUBANA, Munson Line	“ 11

TO COLON

ORINOCO, Royal Mail S. P. Co	Nov. 16
PRINZ SIGISMUND, Hamburg-Am. Atlas Line	“ 16
DUNOTTAR CASTLE, Panama R. R. Line	“ 18
FINANCE, Panama R. R. Line	“ 22
ALTAI, Hamburg-Am.-Atlas Line	“ 23
COLON, Panama R. R. Line	“ 27
PRINZ EITEL-FRIEDRICH, Hamburg-American Atlas Line	“ 30
ATRATO, Royal Mail S. P. Co	“ 30
ADVANCE, Panama R. R. Line	Dec. 2
VENETIA, Hamburg-Am.-Atlas Line	“ 7
PANAMA, Panama R. R. Line	“ 9
TRENT, Royal Mail S. P. Co	“ 14
DUNOTTAR CASTLE, Panama R. R. Line	“ 14

TO PARA AND MANAOS VIA BARBADOS

CEARENSE, Booth S. S. Line	Nov. 25

TO RIVER PLATE-MONTEVIDEO, BUENOS AIRES AND ROSARIO.

VOLTAIRE, Lamp. & Holt	Nov. 20
DRUMELDRIE, Howard, Holder & Rowatt	“ 25

ARABISTAN, Norton Line......about Nov. 25
OCEAN PRINCE, Prince Line......... " 30
HOSTILIUS, Houston Line........... " 30
HORACE, Lamp. & Holt..............Dec. 5

TO RIO JANEIRO, SANTOS AND SOUTH AMERICAN PORTS

SPARTAN PRINCE, Prince Line......Nov. 19
VOLTAIRE, Lamp. & Holt............ " 20
CHRISTANIA, Sloman Line........... " 30
NORDPOL, Lloyd Brazileiro........... " 30
TENNYSON, Lamp. & Holt...........Dec. 5
A STEAMER, Sloman Line............ " 15

TO PORTO RICO

COSMO, N. Y. P. R. S. S. Line.......Nov. 16
ZULIA, Red D Line.................. " 16
SENECA, N. Y. P. R. S. S. Line....... " 23
PHILADELPHIA, Red D Line........ " 23
MARACAIBO, Red D Line........... " 30
CARACAS, Red D Line..............Dec. 7

TO SOUTH AFRICA

CORFE CASTLE, Am. & Afr. Line....Nov. 16
HORATIUS, Houston Line............ " 20
A STEAMER, Hansa Line............ " 30
NORSE PRINCE, Prince Line...late December

TO HALIFAX, NOVA SCOTIA, ST. JOHNS, N. F.

SILVIA, Red Cross Line..............Nov. 26
ROSALIND, Red Cross Line...........Dec. 9

TO AUSTRALIA AND NEW ZEALAND

APOLDA, Tyser Line.................Nov. 16
LORD SEFTON, Am. & Aust. Line.... " 16
VICTORIAN, White Star Line........ " 26
NEW ORLEANS, Am. & Aust. Line.... " 30
CLAN MACKINNON, Am. & Aust. Line " 30
BOVIC, White Star Line..............Dec. 3
INDRALEMA, Tyser Line............ " 7

TO CHINA AND JAPAN

TUDOR PRINCE, Am. & Oriental Line, about Nov. 20
A STEAMER, Am. & Manchurian Line.. " 20
HOHENFELS, Am. & Asiatic Line..... " 25
MANICA, Am. & Manchurian Line..... " 30
SWAZI, Am. & Manchurian Line......Dec. 15

TO BOMBAY, CALCUTTA AND INDIA PORTS

ROTENFELS, Am. & Ind. Line........Nov. 20

BOSTON SAILINGS.

TO LIVERPOOL

SYLVANIA, Cunard Line..............Nov. 19
CANADIAN, White Star Line......... " 20
SAGAMORE, Warren Line............ " 23
SAXONIA, Cunard Line.............. " 26
WINIFREDIAN, Leyland Line........Nov. 27
MICHIGAN, Warren Line............ " 30
CYMRIC, White Star Line.............Dec. 4
IVERNIA, Cunard Line.............. " 10
BOHEMIAN, Leyland Line............ " 11

TO LONDON

LANCASTRIAN, Leyland Line.........Nov. 22
ANGLIAN, Wilson & Furness-Leyland Line .... " 29
PHILADELPHIAN, Wilson & Furness-Leyland Line......................Dec. 6

TO GLASGOW

LAURENTIAN, Allan Line............Nov. 23
NUMIDIAN, Allan Line.................Dec. 14

TO MANCHESTER

IBERIAN, Leyland Line...............Nov. 23

TO COPENHAGEN, CHRISTIANIA AND STETTIN

NICOLAI II, Scan.-Am. Line..........Nov. 20
ALEXANDRIA, Scan.-Am. Line.......Dec. 10

TO HAMBURG

BADENIA, Hamburg-Am. Line........Nov. 22
BOSNIA, Hamburg-Am. Line..........Dec. 4

TO MEDITERRANEAN PORTS

CANOPIC, White Star Line...........Nov. 16
ROMANIC, White Star Line...........Dec. 5

TO HULL

IDAHO, Wilson Line.................Nov. 21

TO ANTWERP

MARQUETTE, Red Star Line.........Nov. 21

PHILADELPHIA SAILINGS.

TO LIVERPOOL

NOORDLAND, American Line.........Nov. 16
MERION, American Line.............. " 30
HAVERFORD, American Line.........Dec. 12

TO ANTWERP

MARQUETTE, Red Star Line.........Nov. 29
MANITOU, Red Star Line............Dec. 13

TO LONDON

MACKINAW, Atlantic Trans. Line....Nov. 23
MONTANA, Atlantic Trans. Line......Dec. 5
CROWN POINT, Phila. Trans-Atl. Line, Nov. 28

TO HAMBURG

ARMENIA, Hamburg-Am. Line........Nov. 23
BARCELONA, Hamburg-Am. Line..... " 30
PISA, Hamburg-Am. Line.............Dec. 10

TO GLASGOW, SCOTLAND, AND ST. JOHNS, N. F.

CARTHAGINIAN, Allan Line.........Nov. 19

TO MANCHESTER

MANCHESTER EXCHANGE, Phila.-Manchester Line...................Nov. 16
MANCHESTER COMMERCE, Phila.-Manchester Line.................... " 30

TO ROTTERDAM

AMSTELDYK, Holland-Am. Line......Nov. 22
SOESTDYK, Holland-Am. Line........Dec. 6
PHILADELPHIA, Cosmopolitan Line..Nov. 23
CIMBRIA, Cosmopolitan Line.......... " 30

TO LEITH

MORA, Cosmopolitan Line.............Nov. 30

TO COPENHAGEN

LOUISIANA, Scan.-Am. Line..........Nov. 30

BALTIMORE SAILINGS.

TO LONDON

MEMPHIS, Atlantic Trans. Line......Nov. 20

TO HAMBURG

BETHANIA, Hamburg-Am. Line.......Nov. 21

TO BELFAST, DUBLIN AND CARDIFF

LORD LONDONDERRY, Lord Line (Dublin and Cardiff).............Nov. 16
LORD IVEAGH, Lord Line (Belfast).. " 29

TO ROTTERDAM AND AMSTERDAM

OHIO, Neptune Line..................Nov. 16
QUEEN WILHELMINA, Neptune Line. " 23
RUNO, Neptune Line................. " 30

TO ANTWERP

OAKMORE, Puritan Line.......about Nov. 15
MEMPHIS, Red Star Line............ " 20

TO BREMEN

BRANDENBURG, North German Lloyd, Nov. 20
CASSEL, North German Lloyd........ " 27
KOELN, North German Lloyd..........Dec. 11
BRESLAU, North German Lloyd....... " 18

TO LIVERPOOL

ROWANMORE, Johnston Line.........Nov. 23
TEMPLEMORE, Johnston Line........ " 30
QUERNMORE, Johnston Line.........Dec. 7
ULSTERMORE, Johnston Line........ " 14

NEWPORT NEWS & NORFOLK SAILINGS.

TO LIVERPOOL

MARIANA, C. & O. S. S. Line...about Nov. 30

TO LONDON

ALLEGHANY, C. & O. S. S. Line, about Nov. 25

TO ROTTERDAM AND AMSTERDAM

A STEAMER, Holland-Am. Line........Dec. 5

TO HAMBURG

PALLANZA, Union Line..............Nov. 30

CATALOGUES FOR SOUTH AFRICA.

Cape Town, South Africa, Sept. 28, 1907.

To the Editor of the American Exporter:

As this Consulate General is about to open a Commercial Information Bureau and Reading Room, the American Exporter will be especially appreciated in this connection.

This bureau is intended to furnish accurate information, prices and discounts of as many articles as possible manufactured in the United States to purchasers of American goods in South Africa. Thousands of circulars are being distributed in this country, which will bring the bureau to the notice of those likely to be interested, and inviting correspondence. It is therefore of the utmost importance to make this bureau a success, and a large number of our manufacturers should send to this Consulate General their catalogues, with lowest prices and exact export retail and wholesale discounts, giving the name and address of their agents in this country, if any, and other useful information.

I should consider it a favor if you would give this subject as much publicity as possible.

Faithfully yours,

Julius G. Lay.
American Consul General.

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Berlin, Leipzig, Hanover	.40	.45	.60	.75	1.00	1.50	1.60	1.95	2.25	2.55	2.85	3.00	3.15	3.25	1.50	.40
All other places in Germany	.45	.55	.75	1.00	1.20	1.50	1.85	2.15	2.45	2.75	3.00	3.20	3.35	3.50	1.75	.40
Liverpool	.20	.35	.45	.60	.70	.90	1.20	1.50	1.75	1.95	2.15	2.30	2.40	2.50	1.00	.30
London, Glasgow	.35	.45	.55	.75	.90	1.10	1.50	1.90	2.25	2.50	2.75	3.00	3.25	3.50	1.80	.40
All other places in Great Britain and Ireland	.45	.55	.65	.80	.95	1.20	1.60	2.00	2.35	2.60	2.85	3.10	3.35	3.60	1.90	.40
Havre	.20	.35	.45	.60	.75	.90	1.20	1.50	1.75	1.95	2.15	2.30	2.40	2.50	1.50	.30
Paris, Rouen	.45	.55	.70	.90	1.15	1.35	1.85	2.25	2.50	2.75	3.00	3.25	3.50	3.75	1.95	.40
All other places in France	.60	.90	1.10	1.25	1.50	1.75	2.25	2.75	3.25	3.75	4.25	4.50	4.75	5.00	2.50	.40
Antwerp, Amsterdam and Rotterdam	.35	.40	.50	.60	.80	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	1.75	.40
All other places in Belgium, Holland and Switzerland	.55	.70	.90	1.15	1.40	1.70	2.10	2.50	2.90	3.30	3.70	4.00	4.25	4.50	2.50	.40
Vienna, Prague	.50	.65	.90	1.15	1.40	1.65	2.00	2.30	2.60	2.90	3.15	3.40	3.60	3.75	2.00	.40
All other places in Austria-Hungary	.60	.75	1.00	1.25	1.65	2.00	2.50	2.85	3.20	3.50	3.75	4.00	4.25	4.50	2.50	.40
Copenhagen, Christiania, Christiansand	.50	.60	.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	1.80	.50
All other places in Denmark, Norway and Sweden	.70	.90	1.15	1.45	1.70	2.00	2.50	3.00	3.50	3.75	4.00	4.25	4.50	4.75	2.80	.45
Genoa	.50	.60	.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	1.50	.45
All other places in Italy	.80	.90	1.00	1.60	2.20	2.75	3.25	3.75	4.25	4.50	4.75	5.00	5.25	5.50	2.75	.50
All places in Russia, Spain, Portugal and Malta	.80	1.15	1.35	1.65	2.00	2.25	2.75	3.25	3.75	4.25	4.75	5.25	5.75	6.00	3.00	.75
Roumania, Bulgaria, Servia, Greece, Turkey	1.50	1.75	2.25	2.75	3.40	3.75	4.25	4.75	5.25	5.75	6.15	6.40	6.60	6.75	3.30	.65
AFRICA—Egypt, Alexandria	.60	.75	1.00	1.25	1.50	1.75	2.00	2.25	3.00	3.50	4.00	4.50	4.75	5.00	3.50	.60
All other places in Egypt	.75	1.00	1.25	1.75	2.00	2.50	2.75	3.00	3.50	4.00	4.50	5.00	5.50	6.00	3.50	.75
Morocco, Algeria, Tunis and Tripoli	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.25	6.50	.500	.75
Capetown, Port Elizabeth and Port Natal	.55	.60	.80	1.00	1.25	1.50	1.75	2.00	2.50	2.75	3.00	3.50	4.00	4.50	4.00	1.00
All other places in British Guinea, Africa, Transvaal and Orange Free State	1.25	1.50	2.00	2.25	2.50	2.75	4.00	4.75	5.25	5.75	6.25	6.75	7.25	8.00	6.00	1.00
ASIA—Bombay, Calcutta, Madras and Colombo	.55	.60	1.00	1.25	1.75	2.25	3.00	3.75	4.25	4.50	4.75	4.90	5.00	5.25	4.05	1.00
All other places in India and Ceylon	.75	1.00	1.50	2.00	3.00	4.00	5.00	6.00	6.50	7.00	7.50	8.00	8.50	9.00	5.75	1.50
Hong Kong, Shanghai, Penang, Singapore and Yokohama	.50	.60	1.00	1.50	2.00	2.25	2.75	3.25	3.50	3.75	4.50	4.75	5.00	5.25	3.30	1.25
All other places in China and Japan	.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	4.40	1.50
Manila	1.00	1.00	1.00	1.50	2.00	2.00	2.25	2.75	3.25	3.75	4.25	5.50	6.00	6.25	4.20	1.50
AUSTRALASIA—Melbourne, Sydney and Adelaide	.50	.50	.50	.75	1.00	1.25	2.00	2.25	2.50	2.75	3.00	3.20	3.35	3.50	2.15	1.00
Wellington, Auckland, Lyttelton and Dunedin	.60	.60	.95	1.25	1.50	1.75	2.25	2.75	3.25	3.75	4.25	4.50	4.75	5.00	3.25	1.00
All other places in Australia and New Zealand	.75	1.00	1.25	2.00	3.00	3.50	4.50	5.50	6.00	6.00	6.00	6.50	6.50	6.50	3.60	1.50
WEST INDIES—CUBA, Havana, Matanzas, Cienfuegos and Santiago	.40	.45	.60	.70	.80	1.00	1.40	1.70	2.00	2.25	2.50	2.75	3.00	3.50	2.30	.50
All other places in Cuba	.90	1.00	1.30	1.60	1.75	1.95	2.40	2.80	3.20	3.60	4.00	4.50	5.00	5.50	3.50	.75
PORTO RICO—Ponce, San Juan, Mayaguez	.45	.50	.65	.75	.90	1.10	1.45	1.75	2.10	2.40	2.75	3.00	3.25	3.50	1.50	.75
All other places in Porto Rico	.90	1.00	1.30	1.60	1.75	1.95	2.40	2.80	3.20	3.60	4.00	4.50	5.00	5.50	3.50	.75
Bermuda	.30	.40	.50	.75	1.00	1.25	1.30	1.50	1.75	2.00	2.20	2.40	2.60	3.00	2.10	.50
Jamaica, Hayti, Trinidad, Turk's Island, Martinique, Grenada, St. Thomas, St. Croix, St. Kitts and Bahama Islands	.50	.75	1.00	1.25	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	2.10	.50
Main Ports in CENTRAL AMERICA—Costa Rica, Guatemala, Honduras, Nicaragua and San Salvador	1.25	1.35	1.50	1.75	2.00	2.25	2.50	3.00	3.25	3.50	3.75	4.00	4.25	4.50	3.20	.75
GUIANA—British, Dutch and French	1.25	1.35	1.50	1.75	2.25	2.35	2.50	2.65	2.75	3.00	3.25	3.50	3.75	4.00	2.20	1.00
SOUTH AMERICA—United States of Colombia	1.25	1.35	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.25	6.50	4.25	1.00
Brazil—Bahia, Para, Pernambuco, Santos, Rio de Janeiro	1.50	1.75	2.25	2.50	2.75	3.25	4.00	5.00	6.00	6.50	6.50	6.75	6.75	7.00	4.25	1.00
Chili, Peru and Ecuador	2.00	2.50	3.00	3.50	4.00	4.25	4.50	4.75	5.00	6.00	6.25	6.50	6.75	7.00	4.25	1.00
Buenos Aires and Montevideo	.75	1.00	1.25	1.50	2.00	2.25	2.75	3.25	3.75	4.25	4.50	4.75	5.00	5.50	3.20	1.00

The above rates are figured at 25 pounds for every cubic foot measurement; if measurement exceeds one cubic foot to every 25 pounds the rate will be higher in the same proportion.

To countries named below consular invoices are required, which must be written in language of country goods are destined to, and on certain prescribed forms. **Failure to comply with this rule** will subject goods to seizure. Dominica, Costa Rica, Guatemala, Honduras, Nicaragua, San Salvador, Brazil, Argentina, Ecuador, Peru, Paraguay, United States of Colombia, Uruguay, **Venezuela**, Chili.

Current Foreign Freight Quotations From New York

(Furnished by Export Shipping Co.)

FOR GENERAL CARGO.

Liverpool 15/—	London 15/—	Glasgow 15/—	Bristol 15/—	Leith 17/6	Hull 17/6	Antwerp 15/—	Bremen 12c. cu. ft.	Hamburg 12c. cu. ft.	Rotterdam 12c. cu. ft.	Marseilles 17/6
Copenhagen 17/6	Havre 15c. cu. ft.	Trieste 17/6	Naples 17/6	Genoa 17/6	Barcelona 25/—	Alexandria 27/6	Constantinople 27/6	Bombay, Calcutta 30/	Singapore, Shanghai, Manila, Yokohama 35/	Melbourne, Sydney 35/
New Zealand Ports 35/—	Cape Town 35/—	Havana 15c. cu. ft.	San Juan 15c. cu. ft.	BuenosAires, Montevideo 13c. cu. ft.	Rio de Janeiro 24c. cu. ft.	Callao 31c. cu. ft.	Valparaiso 26c. cu. ft.			

To all rates quoted in sterling add 5 per cent. primage. Rates per ton are for 2,240 lbs., or 40 cubic feet, at ship's option.

Safe, Steady and of Large Volume

That Is What Export Business Is When Carried On Properly

OUR BUSINESS IS TO DEVELOP TRADE ABROAD FOR AMERICAN MANUFACTURERS. For over twenty years we have been building up a **FOREIGN SELLING ORGANIZATION** acquiring knowledge of and experience in foreign markets.

OUR ORGANIZATION (including the services of our own foreign offices and show rooms and an expert selling force abroad) IS OPERATING FOR THE BENEFIT OF A LIMITED NUMBER OF AMERICAN MANUFACTURERS EVERY WORKING DAY, ALL DAY LONG.

Do You Want to Be One of Them?

Our facilities are increasing steadily, and we are now open to accept a few new accounts. Correspondence solicited with manufacturers desiring to extend their export business.

GUITERMAN, ROSENFELD & CO., 35 South William St., New York

Offices in London, Hamburg and Paris, covering Great Britain and the European Continent.
Resident Traveling Salesmen or Agents in Australia, New Zealand, Japan, China and Argentine.

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All the appointments of a first-class Printing office, with Bindery

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THERE IS NO MARKET IN THE WORLD TODAY WHICH OFFERS SUCH OPPORTUNITIES FOR AMERICAN MACHINERY AS RUSSIA

¶ A great industrial awakening is everywhere evident throughout the empire. The primitive and shoddy Continental machinery heretofore in use is being discarded.

¶ The American manufacturers who take advantage now of the inauguration of this important movement will secure the greater share of the profits.

¶ We devote our entire time and attention to the introduction of high-grade American machinery in Russia. Our engineers and salesmen are in close touch with all important contemplated improvements and projects requiring first-class equipment.

¶ We would be pleased to correspond with manufacturers of high-grade wood-working machinery, stone-working machinery, mining machinery, excavating machinery, cotton mill and oil mill machinery, flour mill machinery and all kinds of special process machinery.

The American Machinery Company

ANATOLE J. FOMILYANT, PRESIDENT

16 GOGOL STREET ST. PETERSBURG, RUSSIA

WANTED

Catalogues and Circulars of Typewriters, Electric Novelties, Safes, Flooring Tiles, Metal Ceilings and Knitting Machines.
C. G. VAKILNA, Commission Agent,
No. 19 Churchgate Street, BOMBAY. INDIA.

Advertising Copy for
AMERICAN EXPORTER

must be received not later than the 5th of the month preceding date of issue, if proof is to be shown.

PEDRO CASTANER & SON

P. O. BOX 56

Aguadilla, Puerto Rico

Commercial agents, well connected in Aguadilla and vicinity, desire to represent American manufacturers and exporters as selling agents for their products, and solicit correspondence and catalogues.

FACTS!

The volume of advertising carried in the AMERICAN EXPORTER for the year ending November, 1907, issues, averages

116½ pages net (averaging the business in both English and Spanish editions)

as against **77½ pages** the year previous,

a net gain of **39 pages.** The average of the six months just completed is **124¾ pages.**

These figures are new records in Export Advertising.

What do they mean?

Not only that American manufacturers are going after foreign trade as they never have before, but also that they choose the AMERICAN EXPORTER as the medium for reaching into foreign markets.

Foreign trade is one of the very best assets a manufacturer can have. It assures continued prosperity even in times of home depression.

AMERICAN EXPORTER, New York

Cable Address: "ALFREDPOST,"
New York, San Francisco, Boston.
"POSTFRED," Hamburg.
"TARHEEL," London.

MEMBERS
N. Y. Maritime Exchange.
N. Y. Produce Exchange.
Baltic Exchange, London.

ALFRED H. POST & CO.

Foreign & Domestic Freight Contractors

Maritime Building, 8-10 Bridge St.

New York, U. S. A.

Special Departments maintained for the following branches our business:

Contracting, Forwarding, Banking, Insurance, Custom House

ALSO OPERATING THE

International Freight Bureau

In the interest of the Members of the

National Association of Manufacturers

OF THE

United States of America

BRANCH OFFICES AT

CHICAGO,	602-7 Monadnock Block	LOS ANGELES,	Pacific Electric Building
BOSTON,	110 State Street	CINCINNATI, OHIO,	802 Traction Building
BUFFALO,	922 Prudential Building	PHILADELPHIA,	29 Drexel Building
SAN FRANCISCO,	Gale Building	MONTREAL,	224 Board of Trade Building

FOREIGN OFFICES AT

LONDON,	14-20 St. Mary Axe	MANCHESTER,	203 Temple Chambers
LIVERPOOL,	17 Water Street	HAMBURG,	68 Ferdinand-strasse

The most extensive equipment in the United States for the handling of Export and Import Traffic by all possible routes to and from all parts of the world. Tell us your requirements and let us show you wherein we can serve your interests.

AGENCIES IN ALL THE IMPORTANT FOREIGN PORTS

Telephone Connections All Offices

Banking Facilities

To Exporters

For Exporters

If your name and that of your foreign customer are satisfactory to us, we will ***purchase your drafts*** (with complete shipping documents attached) on your customers in

Argentine, Uruguay, Chili, Mexico, Australia, New Zealand, South Africa, Great Britain, Germany and other countries in Europe.

The Anglo-South American Bank, Ltd.

CAPITAL AND RESERVE, £3,200,000.

CHAS. A. EDWARDS, Agent,

69 WALL STREET NEW YORK, U. S. A.

AGENTS FOR

The National Bank of Australasia, Ltd.
The National Bank of South Africa, Ltd.

D. S.

WE PRINT ALL KINDS OF
Fac Simile Typewritten Letters
In all sizes of type and display.

They cannot be distinguished from a typewritten letter. Our extensive facilities and wide experience put us in a position to get work out promptly and neatly.

OUR SPECIALTY;

Form Letters for Export Use

The kind that make a good appearance and bring results. We will be glad to furnish samples of our work.

Price list and the best of references on application.

ONCE A CUSTOMER ALWAYS A CUSTOMER.

The N. Y. Process Letter Co.
57 Warren Street Tel. 6898 Cort. **NEW YORK, N. Y.**

H. W. SOLFLEISCH CO.
32 & 34 VESEY ST., NEW YORK

ENGRAVED CARDS, ENVELOPES LETTERHEADS, ETC.

LATEST DIE EMBOSSED STATIONERY

POWER STEEL DIE AND PLATE WORK

LEGAL LIGHTS ON STATIONERY LAW
TO THE TRADE

Canadian Industrial Blue Book
BUYERS' GUIDE, 1907. PRICE, $5.00
5th Edition A

Directory to Manufacturers in Canada
150 Pages, Arranged Alphabetically by Towns
100 Pages, Article List. (25,000)
270 Pages, Classified Mfrs. under Article Headings
100 Pages, List of all Manufacturers, Giving Kind of Business and Kind of Power Used to Turn the Wheels of the Plant, Arranged Alphabetically for Addressing Purposes

Address
THE MANUFACTURERS' LIST CO.
Remit by Post Office, Express or Bank Money Order. **Toronto, Canada**

DO YOU CONTEMPLATE ISSUING AN EXPORT CATALOG?

OUR equipment and experience make us specialists in the production of Catalogs and high-class advertising matter, in any language.

If you have been "held up," if you have wasted your time and lost your temper dealing with your engraver, printer and binder separately, send for our representative and outline to him what you expect to do. He is trained to take all annoying details off your shoulders, and to present to you, in concrete form, just what will give you the best results at the least expense.

THE THOMAS PRESS
Phone: 1230 / 3128 Beekman **18 and 20 Rose Street, New York**

Francisco T. Ramirez

Would like to represent American manufacturers in Mexico. Excellent references furnished.

CORRESPONDENCE SOLICITED

Agent of Industrial Bureau, Department of Colonization, Mexican Government, and of the International Finance Association.

TAPACHULA, CHIAPAS, MEXICO

GERMAN

Young and energetic, financially responsible, with twelve years' experience in Export Trade in United States and Germany, who is going into business in Hamburg, Germany, wants to represent there a few more first class American Houses or Manufacturers as Purchasing or Sales Agent. Best references.

Apply E. W. K., Box 273, Lynchburg, Va.

Manufacturers Seeking Business with Mexico, Central and South America and West Indies

The undersigned offers his services as **Traveling Representative** in any one of the above Countries, to some **Reliable House.** Of American birth, he has had large experience with the Countries named, having travelled in each one of them, his practical knowledge fitting him for business with them. **References. Correspondence Invited.** Please address

Gustave Rashky

127 West 117th St. **New York City**

Gandia & Stubbe

Est. (P. Gandia), 1888

Commission Merchants

REPRESENTING:

The Sun Life Assurance Co. of Canada
The Liverpool and London and Globe Ins. Co.
The Palatine Ins. Co.

Solicit correspondence with manufacturers of Dry Goods, Carriages, Harnesses, and all kinds of American goods.

P. O. Box No. 771

SAN JUAN **PORTO RICO**

MANUFACTURERS' REPRESENTATIVE FOR GERMANY

Experienced man in Import and Export Trade desires to represent American manufacturers in Germany or Europe. A1 references.

Write H. F. G.
Care of AMERICAN EXPORTER

CONTINENTAL AGENT

Look always for a good representative if you want to get your goods in good hands on the Continent and in its Colonies.
Correspondence solicited.

A. H. VAN GELDER, **P. O. Box 482,**
Amsterdam, **Holland.**

CHARLES NEEDHAM

Manufacturers' Commission Agent

38 Newton Road, Sparkhill
BIRMINGHAM, ENGLAND

Requires agencies for manufacturers of all kinds of **Hardware Goods, Picture Mouldings, Glass Goods, Gold Filled Jewelry, Electroplated Goods,** on commission basis.

I have the connection of buyers if you have the right goods.

Compañía Stempel, S. A.

MEXICO, D. F., Apartado 1489

Import, Export, Consignments, Manufacturers' Agents

Gratis Information on Mexican Investments, Lumber and Farm Lands, etc.

Bank Reference:
Banco de Londres y Mexico, Mexico City.

DR. J. H. T. STEMPEL, President

German Agency

ROBERT LINDENTHAL, now manager for Arthur Koppel Co., New York, will leave that company and open an office in Berlin for the purpose of marketing American manufactured goods in Europe, and to act as buyer of European manufactured goods for Export to the United States.

A limited number of lines are solicited, representing only high-class American manufacturers.

For particulars address

ROBERT LINDENTHAL,
No. 35 Pineapple St.,
Brooklyn, N. Y.

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